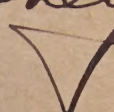


BOTANICAL ABSTRACTS

M. J. Lorne 

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BOTANICAL ABSTRACTS

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J. R. SCHRAMM, Editor-in-Chief
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No. 3

ENTRIES 2066-3265

AGRONOMY

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(See also in this issue Entries 2234, 2305, 2328, 2456, 2492, 2499, 2632, 2847, 2900, 2959, 2960, 2962, 3041, 3057, 3065, 3100, 3103, 3124, 3139, 3140, 3156, 3161, 3163, 3172, 3174, 3180, 3184, 3194, 3196, 3231, 3258)

2066. ANONYMOUS. Agricultural possibilities in Ceylon: Fibres. *Tropic. Agric.* 56: 1-2. 1921.—Sisal, *Agave sisalana*, has been shown to be well adapted for cultivation in the dry zone of northern Ceylon. A syndicate has undertaken the cultivation of sisal and *Furcraea* in that region.—*Lyster H. Dewey*.

2067. ANONYMOUS. Cane experiments on the South Coast. Results obtained at Winkle Spruit. *South African Sugar Jour.* 6: 27. 1922. [Rev. of some of the results published in Vol. 3 of the "Cedara Memoirs" of the Cedara School of Agriculture.]—The Uba variety of cane is most suited for general cultivation in the coastal region of Natal. It is deep rooting, drought resistant, and does not suffer much from fungus diseases. A new variety, Agual, has lately proved successful for general work. The greatest returns come from planting the cane in 5 foot rows, sets 3 feet apart in the row. The cane should be trashed, not burned. After a period of growth, determined by soil conditions, the cane should be plowed out and replanted. This cane can best be used for seed purposes when 12 months old. The tops give the most vigorous growth. The Agricultural Department's station at Winkle Spruit near Durban was closed November, 1921, the station having served the purposes for which it was established in 1902,—i.e., "to investigate the problems of coastal agriculture in Natal."—*C. Rumbold*.

2068. ANONYMOUS. Departmental varieties tried at Currabubula. *Agric. Gaz.* New South Wales 33: 92. 1922.—The results with wheat, oats, and barley varieties "afford undeniable evidence that the varieties grown by the majority of farmers in the district are inferior yielders compared with those recommended by the department."—*L. R. Waldron*.

2069. ANONYMOUS. Field experiments, 1921. *Jour. Dept. Agric. Ireland* 21: 437-451. 1921.—This paper discusses results of variety tests with barley, potatoes, mangels, oats, turnips, and wheat; manurial tests with potatoes, turnips, and wheat; and a cultivation test with potatoes.—*Donald Folsom*.

2070. ANONYMOUS. Keeping growing potatoes cool. *Sci. Amer.* 125-A (Dec.): 127. 1921.—It is said that the potato plant flourishes best at a soil temperature of 70°F. A temperature of 90°F. is about the upper limit of safety. Deep and constant cultivation is probably the best procedure when abnormal heat begins to bake the soil.—*Chas. H. Otis.*

2071. ANONYMOUS. La harina de Yuca. [Yuca flour.] *Rev. Agric. Com. y Trab. [Cuba]* 4: 622-624. 1921.—Brazil produces annually 500,000 tons of this flour, which is in daily use in South America. The Yuca plant, *Manihot manihot*, grows extensively in Cuba. Investigations were conducted in the hope of reviving the production and use of this flour. Methods and costs of preparing the flour and returns from growing the crop are briefly discussed and recipes given.—*G. R. Hoerner.*

2072. ANONYMOUS. Report of the work of the seed propagation division for 1921. *Jour. Dept. Agric. Ireland* 21: 452-476. 1921.—Wheat, oats, barley, flax, and grass are considered in regard to pure line cultures, hybridization, large scale and small scale variety tests, and time of sowing (of barley). Formalin treatments prevented barley smut (*Ustilago Hordei*). Change of habitat for 1 year influenced the next year's yield of a pure line of flax.—*Donald Folsom.*

2073. ANONYMOUS. Sugar cane in Uganda. *South African Sugar Jour.* 6: 21. 1922.—This is a review of a report by J. D. SNOWDEN of the Department of Agriculture, Kampala, of experiments at the Government plantation in the district of Uganda. The Government plantation imported seed cane in 1916 from Mauritius, India, and Kenya. The cane matures in 15-18 months after planting, but is hard to harvest as it ripens irregularly. December-January is the best defined ripening period. The cane is free from disease. The 6 best varieties for sucrose content are No. 3 Red, Sealy's Seedling, Ceylon cane, Striped Tanna, B. 3922, and Uba. The Uba, a swamp variety, came from India.—*C. Rumbold.*

2074. ANONYMOUS. The R. A. S. field wheat competition. *Agric. Gaz. New South Wales* 33: 1-6. 1922.—This article discusses principles of wheat growing on the northwestern slopes and plains of New South Wales and tabulates the details of the awards.—*L. R. Waldron.*

2075. ANONYMOUS. The sugar cane industry in East Africa. *South African Sugar Jour.* 6: 29. 1922.—In Portuguese East Africa the soil is fairly good, the land flat, and mechanical work easy. The wet season usually lasts from December until April, the rainfall varying from 30 to 45 inches, being heaviest near the coast. After the land is cleared it is double-plowed 18-24 inches deep. Shallow drains are constructed 40-50 feet apart by a surface plow. The cane rows are 6 feet apart. Uba is the most successful variety grown. The plants are weeded and cleaned until about 6 months old, then left alone as the trash and leaves adhere so closely it is practically impossible to clean them. When 18-20 months old they are burned and cut, the yield being about 60 tons per acre. After this the only work is weeding and moulding for another 6 months. The Uba ratoons well to the 3rd or 4th ratoon. The ratoons are cut after about 12 months and yield 13-30 tons per acre. Insect pests are not troublesome so far, due perhaps to the hard rind of the Uba cane.—*C. Rumbold.*

2076. ANONYMOUS. Three field wheat competitions. The western districts. *Agric. Gaz. New South Wales* 33: 21-25. 1922.—Principles of wheat growing for the western district are discussed and details of the awards among the successful competitors are tabulated. Fallow preceding wheat is strongly recommended.—*L. R. Waldron.*

2077. ALDABA, VICENTE C. The cultivation of Abacá and preparation of its fiber in Davao. *Philippine Agric.* 10: 273-282. 1922.—Eight varieties, designated by local names, are cultivated in Davao. The principal varieties are Maguindanao and Boñgolanon, the latter rapidly gaining in favor because its fiber is easily cleaned. It is resistant to drought and grows well on a wide range of soils, but is short-lived, declining rapidly after about 6 years.

The plantations are mostly in deep alluvial soils along the Davao Gulf coast, where the rainfall of 2300 mm., falling mostly at night, is well distributed. Cultivation and preparation of the fiber are described. The fiber from the outer 6-8 leaf-stalks constitutes the "streaky" grades. From the next 10-12 the fiber is very white and constitutes the C, D, and E Government grades. From the remaining 3-5 sheaths the fiber is soft and white, constituting grades A and B. Harvesting, beginning 2-3 years after planting, is repeated every 3-4 months.—*Lyster H. Dewey.*

2078. ALTER, J. CECIL. *Alfalfa seed growing and the weather.* Utah Agric. Exp. Sta. Bull. 171. 31 p., 9 fig. 1920.—The yield of alfalfa seed is largely dependent upon climatic conditions. The best seed yields seem to require an abnormally warm spring with abundant rainfall to produce a vigorous, early hay crop, followed by a summer a little cooler than usual, without too much precipitation, to give a slow and gradual growth of the seed plants. Too much moisture in summer causes the plant to produce herbage rather than flowers and seed. Rainfall or irrigation must be timely to insure the proper filling of the seeds. Blossom time appears to be most critical. Excessive warmth and drought cause the blossoms to wilt and blight, and rainfall or cloudy weather interfere with fertilization by reducing insect activity and by making it more difficult to trip the trigger mechanism of the alfalfa blossom. The mean monthly temperatures found most advantageous to seed production are: March, 40°F.; April, 48; May, 56; June, 65; July, 70; and August, 75°F.—*B. L. Richards.*

2079. ARNIM, VON. *Zu den Leipziger Verhandlungen über Futtersilofragen.* [The Leipzig discussions of silo questions.] *Mittel. Deutsch. Landw. Ges.* 37: 129-132. 1922.—This summarizes the facts brought out at this meeting.—*A. J. Pieters.*

2080. BARTLETT, H. *More wheat per acre.* Agric. Gaz. New South Wales 33: 77-78. 1922.—The principles of wheat production, especially methods of cultivation and preventives of diseases and weeds are discussed.—*L. R. Waldron.*

2081. BLAKELEY, W. F. *Newly recorded weeds.* Agric. Gaz. New South Sales 33: 6. 1922.—*Chenopodium Vulvaria*, *Sisymbrium Sophia*, and *Centaurea picris* are recorded as new introductions to the Province.—*L. R. Waldron.*

2082. BOERNER, E. G. *Factors influencing the carrying qualities of American export corn.* U. S. Dept. Agric. Bull. 764. 99 p., 72 fig. 1919.—Observations on cargoes of export corn showed that corn which was dry and sound when shipped arrived in Europe in like condition. The higher the percentage of moisture in the corn when shipped, the greater the danger of spoilage. Contributing factors such as season, position on vessel, and length of voyage also affected the carrying quality.—

2083. BOSMAN, A. J. *The chief causes of low yields of maize in the Union.* Jour. Dept. Agric. Union South Africa 3: 507-514. 1921.—The average yield of maize for the year 1917-18, according to the Agricultural Census returns, was 2.2 bags or approximately 8-9 bushels per acre,—a yield decidedly below that of other countries. The year was unfavorable, owing to severe drought. Some of the main contributory factors are irregular or insufficient rainfall, poor soils, poor seed, improper preparation of the soil, failure to practise crop rotation, and shortage of labor.—*E. M. Doidge.*

2084. BROILI, JOS. *Zur Beschreibung der Kartoffel.* [Description of potatoes.] *Fühling's Landw. Zeitg.* 70: 222-232. 1921.—The author outlines a system for identifying potato varieties by describing in detail the various characters of typical plants. Letters of the alphabet are used to designate each peculiarity of the whole plant, stem, leaf, blossom, tuber, and disease condition.—*A. T. Wiancko.*

2085. BROWN, E. B., AND H. S. GARRISON. *Effect of date of seeding on germination, growth, and development of corn.* U. S. Dept. Agric. Bull. 1014. 10 p. 1922.—The corn

germinated more rapidly the later the seeding occurred. Northern grown varieties are capable of starting growth at lower temperatures than the later maturing varieties of central and southern states. The total growth of stalks was greatest from seedings in May and June. The rate of growth was most rapid from June and July seedings. Growth was least and rate of growth lowest from April seedings, and growth was more rapid in the later than in the earlier seedings. The number of ears per stalk, size of ear, and amount of suckering bore no consistent relation to the date of seeding. The pollen-shedding period was longer in plants from earlier seedings than from later seedings. Seedings earlier than normal resulted in slight gains in the date of silking.—*L. W. Osborn.*

2086. BRYCE, N. J. **Cultivation of the castor oil plant.** *Agric. Gaz. New South Wales* 33: 26. 1922.—The castor oil plant was tested at Grafton and Wollongbar. With seed selling at £14 per ton, which it brought at Melbourne, it was found that the crop was not profitable.—*L. R. Waldron.*

2087. BURTT-DAVY, JOSEPH. **Maize as a raw material for manufacture. 1.** *South African Jour. Indust.* 5: 26-33. 1922.—The author enumerates the products and by-products of the maize plant and gives figures and statistics showing the enormous amount of maize consumed in this industry annually in the U. S. A. The physical composition of the maize grain is fully described.—*S. M. Stent.*

2088. BURTT-DAVY, JOSEPH. **Maize as a raw material for manufacture. 2.** *South African Jour. Indust.* 5: 80-85. 1922.—This article discusses the chemical composition of maize grains and gives the results of a number of analyses.—*S. M. Stent.*

2089. BURTT-DAVY, JOSEPH. **Starch and glucose from maize.** *South African Jour. Indust.* 5: 130-136. 1922.—This article deals chiefly with the production of corn oil, gluten, and other products of the maize grain.—*S. M. Stent.*

2090. CALVINO, MARIO. **Ensayos de distancias en la siembra de la caña.** [Experiments on distances in the planting of sugar cane.] *Rev. Agric. Com. y Trab. [Cuba]* 4: 596-601. 1921.—The results of 2 years' experiments are not considered final because in Cuba cane plantings remain for at least 6 years and further cuttings might modify the conclusions. Extensive tables present detailed information under the following headings: experiments on the most convenient distances in planting the cane; total production in sugar cane; total production of sap and commercial production of sugar. The probable error method is used in determining results.—*G. R. Hoerner.*

2091. CALVINO, MARIO. **Ensayos de "seedlings" Cubano en competencia con la caña Cristalina.** [Experiments with Cuban "seedlings" in competition with the sugar cane *Cristalina*.] *Rev. Agric. Com. y Trab. [Cuba]* 4: 582-585. 1921.—At the 2nd cutting 53 Cuban "seedling" canes were compared with varieties of Demerara canes and the standard Cuban variety *Cristalina*. Extensive tables present data on yields of cane, sap, and sugar, and chemical analyses of the cane at the time of cutting. Many of the Cuban seedlings appear superior to *Cristalina*.—*G. R. Hoerner.*

2092. CALVINO, MARIO. **La selección de la caña y el cañaveral de planta-madre seleccionada.** [The selection of sugar cane and the plantation of selected mother plants.] *Rev. Agric. Com. y Trab. [Cuba]* 4: 612. 1 pl. 1921.

2093. CALVINO, MARIO. **Mis ensayos sobre enmiendas y abonos, llevados a cabo en 1914 en México.** [My experiments on correction and fertilizers carried through in 1914 in Mexico.] *Rev. Agric. Com. y Trab. [Cuba]* 4: 576-581. 1921.—Applications of lime to Eckendorfer beets gave a net return of \$110 per hectare. Potassium chloride, superphosphate, ammonium sulphate, and crude powdered gypsum on Alexandrian clover gave, after 4 cuttings,

a net return of \$78 per hectare. Potassium sulphate and Thomas slag on 1-year old common violet Italian clover gave a net return of \$58 per hectare, after 6 cuttings. Bone meal (not ungelatinated), potassium sulphate, and calcium carbonate, on 1 plot of beans, variety "Bayo Gordo," and bone meal (ungelatinated), potassium sulphate, calcium carbonate, and ammonium sulphate on another plot showed net losses of \$4.20 and \$8.40 per hectare respectively. The fertilized plots matured more quickly than the check, but the high cost of fertilizer and low prices for beans resulted in the loss. Wheat following the beans would, it is thought, reflect in its yield the residual effect of the fertilizer and turn the loss to profit. Superphosphate, potassium chloride, crude powdered gypsum, and ammonium sulphate on sweet Italian onions gave a net return of \$79 and \$262 respectively for each of 2 plots. The 1st plot was treated like the 2nd minus the ammonium sulphate, which apparently was the important factor. Bone meal, ammonium sulphate, and potassium sulphate on turnips (white rutabaga) gave a net return of \$160 per hectare. Potassium chloride, superphosphate, ammonium sulphate, and gypsum on sweet white Italian onions gave a net return of \$118 per hectare.—The chemicals were applied in dry sections in the irrigation water. Sulphur flour was applied to 2 plots of onions at the rate of 50 and 100 kgm. per hectare respectively, giving a net return of \$281 and \$792 per hectare.—*G. R. Hoerner.*

2094. CALVINO, MARIO. *Tratamientos especiales de los trozos de caña que se siembran.* [Special treatment of sugar cane cuttings for planting.] *Rev. Agric. Com. y Trab. [Cuba]* 4: 605-611. 8 pl. 1921.—Experiments were conducted to compare the effects of hot water, camphor water, and cold water on the rooting of cane cuttings. Hot water caused a germination of 70 per cent of total buds, camphor water 51 per cent, and cold water 20 per cent. Varying the temperature and time of the hot water treatment showed that 60°C. for 10 minutes gave best results, 95.5 per cent of the buds having germinated within 17 days. It was also found that seed pieces with a single central bud gave better results than those with many buds. Of the former, 80 per cent germinated as compared with 50 per cent of the latter.—*G. R. Hoerner.*

2095. CALVINO, MARIO. *Una leguminosa arbórea de rápido crecimiento, para producir abono verde, madera dura y leña para quemar.* [A tree legume of rapid growth for the production of green manure, durable timber, and fire wood.] *Rev. Agric. Com. y Trab. [Cuba]* 4: 613-615. 2 pl. 1921.—Observations on the use of Mezquite (*Prosopis juliflora* (Sw.) DC.) in Mexico for green manure led to a study of *Cassia siamea*, planted in Cuba from seed sent from the Philippines; 121,200 kgm. of material suitable for green manure and 77,280 kgm. of green wood is produced per hectare. Chemical analysis shows the leaves and stems to contain higher percentages of nitrogen than cowpeas, velvet bean, *Canavalia ensiformis*, *Crotalaria juncea*, or *Caján indicus*. It is not relished as food by animals. It makes good fuel, canes, implement handles, and is a good cabinet wood. Being a bright-flowered evergreen, it is ornamental, and useful as a shade tree and for wind breaks.—*G. R. Hoerner.*

2096. CAMUS, J. S. *Rice in the Philippines.* *Philippine Agric. Rev.* 14: 7-86. Pl. 1-47. 1921.—This is a general treatise on rice-growing as practiced in the Philippines. Over 1200 named varieties were tested, and these reduced to about 990 more or less distinct forms.—*E. D. Merrill.*

2097. CHAUDHURY, NIBARAN CHANDRA. *Jute in Bengal.* *Rev. ed., 288 p., 6 fig.* W. Newman & Co., Ltd.: Calcutta, 1921.—Objections to jute cultivation on the ground that it crowds out necessary food crops are not well founded. Nearly 3,000,000 acres were devoted to jute in India in 1919. The differences between *Corchorus capsularis* and *C. olitorius* are given. There are no accepted common names designating these 2 species. Many races are recognized, but pure races are rarely grown commercially. Soils, climate, cultivation of the crop, and preparation of the fiber are described. The production of the fiber requires much hand work.—*Lyster H. Dewey.*

2098. CH[ÉVALIER], A. [Rev. of: JUMELLE, H. *Les huiles végétales, origines, procédés de préparation, caractères et emplois.* (Vegetable oils, origin, preparation, nature, and uses.) *Encyclopedia Industrielle* 493 p., 125 fig. J. B. Ballière, Paris, 1921 (see Bot. Absts. 11, Entry 2128).] *Rev. Bot. Appl.* 1: 233-235. 1921.

2099. CLARK, CHARLES H. *Experiments with flax on breaking.* U. S. Dept. Agric. Bull. 883. 29 p., 3 fig. 1920.—Three years' experiments on breaking of flax at Mandan, North Dakota, are reported. The rainfall was favorable, especially in 1914 and 1915, and high average yields of flax were produced. In a test of 14 varieties in field plats the "European seed" types, varieties which are commonly grown in the flax area, produced the highest yields. The yield of linseed oil by ether extraction ranged from 33.8 to 37.8 per cent for the different varieties, and the computed yield of oil per acre ranged from 214 to 355 pounds. The growing period, from date of emergence to maturity, averaged 85 days in 1914, 102 in 1915, and 90 in 1916. The ratio of straw to seed ranged from 1.8:1 to 2.9:1 and averaged 2.4:1. The size of seeds produced by the different varieties was compared by the weight of 1000 seeds, which ranged from 4.010 to 4.845 gm. In rate-of-seeding experiments the author found "little advantage in seeding at a heavier rate than 20 pounds (per acre) under semiarid conditions." In date-of-seeding experiments results "indicate an advantage for early seeding." A test in nursery rows of 49 varieties from foreign and commercial sources made it possible to classify the varieties in rather natural groups. The varietal groups suggested are: textile fiber, short fiber, European seed, Argentine, Turkish, Golden, Chinese Turkestan, Abyssinian, Indian, and Egyptian.—A. C. Dillman.

2100. COE, H. S. *Sweet clover seed. Part I. Pollination studies of seed production. Part II. Structure and chemical nature of seed coat.* U. S. Dept. Agric. Bull. 844. 39 p., 6 fig. 1920.—Part I. Aside from mechanical difficulties in harvesting, the chief causes of the prevalent low yields of sweet clover seed are abortion of the seed pods and possibly lack of pollination. The authors report critical studies of the development of the floral organs and the seed, illustrating these with diagrammatic drawings. In tests with pollen of *Melilotus alba* satisfactory germination was obtained both in pure water and in sugar solutions, indicating that atmospheric humidity is not in itself a factor in poor fertilization. Contrary to the opinions of Darwin and others, *M. alba* was found to be self-fertile, although spontaneous self-pollination occurs rarely. The honey bee was by far the most important pollinating agent although more than 60 other insects were noted visiting the flowers. Apparently small insects are as efficient pollinators as large, and the day-flying are much more important than the night-flying species. The insects pollinated from 11 to 31 per cent more flowers on the upper and exposed racemes than on the lower ones. Bursting of the anthers was stimulated by saturating the soil with water at blossoming time, and seed production was increased 26 per cent.—Part II. A review of the literature is followed by an account of chemical tests in which the impermeable parts of the seed coat were found to be the homogeneous "light line" of the Malpighian layer. The light line was impermeable to stains, and its chemical nature was not determined as it reacted to none of the tests. Exposure of the seed for 1 hour to concentrated sulphuric acid did not destroy the light line but did open slight canals through it, thus admitting moisture to the embryo. A bibliography of 44 titles is appended.—L. W. Kephart.

2101. COLEBATCH, W. J. *Lachlan oats.* Agric. Gaz. New South Wales 33: 67. 1922.—This promising variety of Australian origin is derived from Algerian crossed with Vilmorin's White Ligowo. The grain resembles Algerian but is lighter in color.—L. R. Waldron.

2102. COOK, O. F. *Improvements in cotton production.* U. S. Dept. Agric. Dept. Circ. 200. 12 p. 1921.—The appearance of the boll-weevil has stimulated study in cotton improvement in recent years. Desirable cultural characters are set forth, and improved community organizations and commercial system are discussed.—L. R. Hesler.

2103. CORBOULD, M. K. **Wheat, flour and bread.** Ohio Agric. Exp. Sta. Bull. 350. 187-219, illus. 1921.—Various varieties of wheat grown by the Department of Agronomy at the Ohio Agricultural Experiment Station and certain other varieties grown on the County Experiment Farms in Ohio have been treated individually. Their various characteristics have been carefully studied and are tabulated. Of the "soft red winter" wheat grown in Ohio 2 groups have been designated as "semi-hard" and "soft," the former including those of best quality for all baking purposes. The soft white wheat produces much bran, the semi-hard varieties give a high percentage of flour. Among these are Gladden, Portage, Trumbull, Ohio 9922, Goens, Nigger, Fulcaster, Ohio 8106, and Deitz. The milling qualities of a number of these varieties and the baking value of the various flours are worked out extensively. Each variety is described as to amount of starch and gluten obtained and as to places best adapted for its growth, and Wisconsin and Ohio spring wheats and their milling records are compared.—The following 12 tested varieties are recommended for their quality: Gladden, Portage, Trumbull, Poole, Goens, Nigger, Fultz, Fultz-all-Mediterranean, Valley, Rudy, Mediterranean, and Hickman. The intrinsic qualities of the winter wheats tested are very concisely and comprehensively given.—*R. C. Thomas.*

2104. CZUBER, E. **Zu der Abhandlung E. Alfred Mitscherlich: Feldversuche mit Kartoffeln.** [Concerning E. Alfred Mitscherlich's treatise: Field investigations with potatoes.] Landw. Jahrb. 55: 491-505. 1921.—This criticism is directed mainly to the mathematical treatment of the subject.—*A. J. Pieters.*

2105. DACY, G. H. **Revolutionizing an industry.** Sci. Amer. 124: 446, 457-458. 4 fig. 1921.—The author discusses ways in which modern machinery is minimizing hand labor in hemp production.—*Chas. H. Otis.*

2106. DAHL, A. L., AND R. GOTTHOLD. **The story of sugar.** Sci. Amer. 125-A (Dec.): 128-130. 4 fig. 1921.—This popular article discusses the source of the world's raw material and its conversion into sugar.—*Chas. H. Otis.*

2107. DONKIN, J. E. **Chinese lucerne.** Jour. Dept. Agric. Union South Africa 3: 257-258. 1921.—This is a short note on the culture of this variety of lucerne.—*E. M. Doidge.*

2108. DONKIN, J. E. **Growing lucerne for seed.** Jour. Dept. Agric. Union South Africa 3: 446-448. 1921.—This is a short note on the growing of lucerne for seed, a matter of increasing importance owing to the restrictions on the importation of lucerne seed.—*E. M. Doidge.*

2109. DONKIN, J. E. **Imported lucerne, wheat, etc., tested at Grootfontein.** Jour. Dept. Agric. Union South Africa 3: 539-541. 1922.—This is a short report on seeds imported from America, Australia, India, and elsewhere. No very conclusive results have been attained.—*E. M. Doidge.*

2110. EDWARDS, H. T. **The production of binder-twine fiber in the Philippine Islands.** U. S. Dept. Agric. Bull. 930. 19 p., 4 fig. 1920.—Most of the binder-twine on the market is made of henequén fiber from Yucatan. The area devoted to the cultivation of sisal, *Agave sisalana*, and Manila mañghey, *Agave cantala*, in the Philippines increased from about 8,000 acres in 1912 to more than 28,000 in 1919. As a result of cooperation between the U. S. A. Department of Agriculture and the Philippine Bureau of Agriculture, machine cleaning for sisal and Manila mañghey fibers has been commercially established in the Philippines.—*Lyster H. Dewey.*

2111. ESTRADA, MARIO. **El cañamo, su cultivo en la Republica Argentina.** [Hemp, and its cultivation in the Argentine Republic.] Nuestra Tierra 5: 338-346. 11 fig. 1921.—Hemp, *Cannabis sativa*, is cultivated successfully in Chile and the conditions of soil and climate

in certain parts of Argentina are regarded as favorable. It has been tried experimentally near Pergamino, Mendoza, and in 1920-21, 420 hectares were grown in Tunuyan. Hemp seed from Chile, Kentucky, Syria, China, and Japan were tested. The plants grew well but the statements and the illustrations show that the harvest was delayed too long to secure good fiber.—*Lyster H. Dewey.*

2112. FISHER, F. The growth of leguminous crops. Jour. Dept. Agric. Union South Africa 3: 527-538. 1921.—These cultural notes on a number of leguminous plants which are suited to South African conditions include cowpeas (*Vigna* sp.), soy beans, the ground nut (*Arachis hypogaea*), vetches (*Vicia sativa* and *V. villosa*), lupines, and beans.—*E. M. Doidge.*

2113. FRAPS, G. S. The composition and value of wheat by-products. Texas Agric. Exp. Sta. Bull. 282. 42 p. 1921.—This bulletin contains 23 tables giving composition, food values, results of digestion experiments, etc.—*L. Pace.*

2114. FRIEBE. Der Einfluss der Saatzeit auf den Proteingehalt der Gerstenkörner unter besonderer Berücksichtigung der Eignung der Gerste zu Brauzwecken. [The influence of time of seeding upon the protein content of barley, with special reference to its suitability for brewing.] Fühling's Landw. Zeitg. 70: 296-307. 1921.—Hanna and Goldthorpe, 2 typical varieties of barley, were seeded March 25, April 3, April 19, and May 5, on 3 kinds of soil,—light sandy, medium loam, and heavy clay. The protein content of the grain increased steadily from the earliest to the latest seeding, whereas the proportion of good grain diminished as the date of seeding became later. The yields also diminished with the later seedings. A good grade of barley for brewing should contain about 10.5 per cent of protein. The best grade was secured from the 2 earlier seedings on the loam soil, averaging 10.24 per cent of protein. The 3rd seeding averaged 11.9 and the 4th 15.45 per cent of protein. All seedings on the clay and sandy soils were too high in protein content, ranging from 11.3 in the earliest seeding to 16.7 in the latest seeding on the sandy soil and from 12.2 in the earliest seeding to 16.2 in the latest seeding on the clay soil. The highest percentage of good grain was obtained from the earlier seedings on loam soil.—*A. T. Wiancko.*

2115. FYNN, H. C. K. Statistics of crops grown by Europeans in Southern Rhodesia for the season 1920-1921. Rhodesia Agric. Jour. 19: 29-36. 1922.—This report includes: (1) statistical statement of crops 1920-1921; (2) districts in order of acreage of cultivated land; (3) cultivated crops in order of area in 1920-21; (4) acreage in relation to class of crop; (5) number of farms and ranches by districts.—*E. M. Doidge.*

2116. HALL, W. S. Annual white sweet clover. Jour. Dept. Union South Africa 3: 463-465. 1921.—The annual white sweet clover is attracting much attention in America because of its promise as a legume in short rotations and its value as a forage crop. It is being tested at Cedara Experiment Station with a view to ascertaining its agricultural value in South Africa. The plant is described and cultural directions are given.—*E. M. Doidge.*

2117. HARRIS, F. S. The duty of water in Cache Valley, Utah. Utah Agric. Exp. Sta. Bull. 173. 16 p., 9 fig. 1920.—This is a summary of 17 years of irrigation experiments, giving in brief the water requirements of certain crops, both as to amount of water and its distribution through the season.—*B. L. Richards.*

2118. HARRIS, F. S., AND D. W. PITTMAN. Relative resistance of various crops to alkali. Utah Agric. Exp. Sta. Bull. 168. 23 v., 70 fig. 1919.—In a series of experiments to test the alkali resistance of various crops and crop varieties it was found that the cereals were the most resistant of the crops tested. Among forage crops, vetches, cowpeas, alfalfa, and sweet clover were found superior to the grasses and to alsike clover. A wide range of tolerance was noted in different crop varieties.—Results show that salts added to the soil in concentrations greater than 4,000 parts per million of chlorides, 8,000 parts per million of carbonates, and 12,000 parts per million of sulphates are too high to allow a satisfactory yield of the ordinary crops.—*B. L. Richards.*

2119. **HASELHOFF, E.** *Gründüngung auf leichtem und schwerem Boden.* [Green manuring on light and heavy soils.] *Fühling's Landw. Zeitg.* 70: 407-418. 1921.—Attention is called to the large amounts of organic matter and nitrogen that may be added to the soil by the growing and plowing under of leguminous crops, an especially important matter at this time in Germany on account of the scarcity and poor quality of manure due to post-war conditions. The results of experiments are cited showing that green manuring crops of *Serradella*, red clover, and a mixture of peas and vetches produced 21,020, 24,950, and 22,790 kgm. of green substance, respectively, containing 3,227, 3,383, and 6,251, kgm. of organic matter and 65,110, and 145 kgm. of nitrogen, respectively, per hectare as compared with 3,805 kgm. of organic matter and 79 kgm. of nitrogen in 20,000 kgm. of manure. To evaluate these materials in the soil, equal amounts were incorporated in enclosed parcels of earth of 1 gm. surface and the amounts of carbon dioxide produced to the depth of 25 cm. determined during 1 year and 3-year periods. The amounts of carbon dioxide produced the 1st year were 33 mgm. in the untreated soil, 66 in the soil treated with manure, 50 in that treated with *Serradella*, 45 in that treated with red clover, and 38 in that treated with peas and vetches. The amounts of carbon dioxide produced in 3 years were 138, 179, 195, 168, and 179 mgm. respectively. Regarding nitrogen, it is shown that a good leguminous green-manuring crop will add 100 kgm. of nitrogen to the soil per hectare and that such nitrogen is not inferior to that in manure. Furthermore, the growth of leguminous green manuring crops has a pronouncedly beneficial effect on the physical condition of the soil. Experiments are reported showing that leguminous green-manuring crops can be used to advantage after summer-harvested crops and that such seedings should be made as soon as possible after harvest in order to secure the largest benefits. Seedings of vetches were made on July 19, August 5, and August 31. These crops added to the soil 122, 79, and 31 kgm. nitrogen per hectare, respectively, showing the importance of early seeding. Attention is also called to the benefits of seeding clover in small grain crops in the spring. Large crop increases due to green manuring are reported.—*A. T. Wiancko.*

2120. **HEINRICH, M.** *Die Abhängigkeit der Keimtriebkraft vom Keimmedium und ihre Beeinflussung durch verschiedene Beizmittel.* [The dependence of strength of germination upon the germination medium and the influence of different fungicides.] *Landw. Versuchssta.* 98: 65-115. 1921.—For practical purposes it is important to determine the strength of germination of seed as well as the total germination. Fine, medium, and coarse sands of different degrees of moisture were compared as germination media, using different depths of covering of the seed. Fine sand containing 15 per cent of water by weight proved most favorable. As a covering dry coarse sand 1-1.25 mm. diameter was found to be best. Fine, moist sand is objectionable on account of crusting. The depth of covering with dry sand may vary from 3 to 5 cm. without material difference in the results. Aeration of the container through the bottom or sides was found unnecessary; glass beakers proved satisfactory. A method is described using glass beakers 20 cm. high and 12 cm. in diameter. The beakers are filled to within 4 cm. of the top with fine quartz sand containing 15 per cent by weight of water. This is pressed down to 5 cm. below the top. The seed are planted germ end down and covered with 3 cm. of dry coarse sand. The beakers are then covered with plates of glass and kept at 18-20°C. When the first sprouts touch the cover, the strong healthy ones are counted and cut off. The dry sand is then shaken off until the seeds are visible. All sprouts can then be examined for disease or other defects. Tests of formaldehyde- and Uspulun-treated seed showed that formaldehyde had a depressing effect on germination, Uspulun a decidedly favorable effect.—*A. T. Wiancko.*

2121. **HEINRICH, M., UND H. FUNKE.** *Beziehungen zwischen Reinigung des Saatguts und Ernteertrag.* [Relation between grading of seed grains and crop yields.] *Fühling's Landw. Zeitg.* 70: 116-117. 1921.—This is a preliminary report on the grading of 3 lots each of special and ordinary oats, showing that the grain as it comes from the threshing may be very materially improved for seeding purposes by grading out the lighter and poorer seed, resulting in all cases in considerably higher crop yields.—*A. T. Wiancko.*

2122. HEWS, R. D. Cost of producing an acre of potatoes in Aroostook County—1921. *Potato Mag.* 47: 14. 1922.—Estimates from 5 growers of Aroostook County, Maine, averaged \$245 an acre. The average cost per bushel for production, storage, and placing on the local market is estimated at \$1.09.—*Donald Folsom.*

2123. HOFFMANN. Die Beeinflussung der Tabakernten in quantitativer und qualitativer Hinsicht durch Massnahmen der Düngung nach dem heutigen Stande einschlägiger Erfahrung. [Influencing the yield of tobacco quantitatively and qualitatively by fertilizing in accordance with the present status of experience.] *Mitteil. Deutsch. Landw. Ges.* 37: 181–183. 1922.—In this general review of the experience of German farmers the great need of potash is emphasized. Phosphoric acid is to be avoided as much as possible. The influence of nitrogen on the odor of tobacco is pointed out.—*A. J. Pieters.*

2124. HOLDEN, JAMES A. The work of the Scottsbluff reclamation project experimental farm in 1918 and 1919. U. S. Dept. Agric. Dept. Circ. 173. 36 p. 1921.—In this discussion of progress, conditions, and crop experiments with alfalfa seeding and rotation, Turkestan, common alfalfas, sweet clover, and sugar beets are compared, and variety tests of mangels, potatoes, and corn are reported.—*L. R. Hesler.*

2125. HUGHES, H. D., AND F. S. WILKINS. Soy beans in Iowa. Iowa Agric. Exp. Sta. Circ. 65. 4 p. 1920.—Soy beans provided a dependable crop in Iowa, production from the better varieties ranging from 15 to 25 bushels of seed and $2\frac{1}{2}$ – $3\frac{1}{2}$ tons of hay per acre. The beans may also be grown with corn to be pastured.—*Florence S. Willey.*

2126. HUGHES, H. D., AND F. S. WILKINS. Sudan grass in Iowa. Iowa Agric. Exp. Sta. Circ. 66. 4 p. 1920.—Sudan grass is recommended as a good non-leguminous emergency hay crop in Iowa. It surpasses millet or oats in yield and is nearly equal in feeding value. Since it does not take its nitrogen from the air it is not recommended in regular crop rotation.—*Florence S. Willey.*

2127. JOHNSON, E. C. Thirtieth annual report. Washington [State] Agric. Exp. Sta. Bull. 158. 47 p. 1920.—This contains brief divisional reports of experimental work, of which the following are of interest to botanists: In Farm Crops,—field crop varieties, cultural practices, forage crops, plant breeding laws, and crop rotations by E. G. SCHAFER; in Horticulture,—apple rosette, orchard cover crops, renovation of prune orchards, fruit storage, and seed potato production, by O. M. MORRIS; in Plant Pathology,—summary of results on wheat smut (*Tilletia tritici*), including the spore load in relation to the percentage of smut which appears in the crop, resistance of varieties, amount of smut in seedlings at different dates, various seed treatments—including the lime after-bath for preventing seed injury, and a report of new or little known diseases, by F. D. HEALD; in Soils,—fertility work in Western Washington, crop rotation, tillage, and orchard soil investigations, by F. J. STEVENS.—*F. D. Heald.*

2128. JUMELLE, H. Les huiles végétales. [The vegetable oils.] *Encyclopedie Industrielle.* 493 p., 125 fig. J. B. Ballière: Paris, 1921.—In this extensive compilation of information on the vegetable oil industry, the 1st hundred pages are devoted to a résumé of the general physical and chemical characters of vegetable oils, a detailed description with illustrations of the processes involved in extracting and refining them, and a discussion of their various industrial uses. The author then discusses in detail more than 325 vegetable oils giving for each the botanical origin so far as known, place of production, methods of collecting and preparing the source material, principal characteristics, and uses. The work is concluded by a short chapter on vegetable waxes. [See also Bot. Absts. 11, Entry 2098.]—*W. W. Stockberger.*

2129. KENNEDY, E. W. Experience at Condobolin experiment farm. *Agric. Gaz. New South Wales* 33: 88. 1922.—Until recently Condobolin was considered outside the wheat belt,

but under careful operations fair to good crops have been produced during the past few years. In 1921 a maximum yield of 22 bushels per acre was secured. Principles of wheat growing are briefly discussed.—*L. R. Waldron.*

2130. KEPHART, L. W., AND R. McKEE. Hairy-vetch seed production in the United States. U. S. Dept. Agric. Bull. 876. 32 p., 7 fig. 1920.—The production of hairy vetch seed in various parts of the U. S. A. is discussed in detail as regards growing the crop, harvesting, thrashing, cleaning, and marketing. Considerable hairy vetch seed is imported annually into the U. S. A., the amounts for the years 1905–1919 varying from 67,683 to 4,547,824 pounds. The annual production in the U. S. A. for 1915–1919 was about 1,000,000 pounds, the greater part being produced in Michigan. Many widely separated localities in the Atlantic and Gulf Coast States produce small amounts of seed. It is contended that it is desirable to grow more seed on the farm for home use.—*Roland McKee.*

2131. KRÜGER, W. Zeit und Streitfragen auf dem Gebiete des Zuckerrübenbaues. [Current and controversial questions in the field of sugar beet culture.] Mitteil. Deutsch. Landw. Ges. 37: 217–220. 1922.—In this address the author briefly discusses the questions of selection, fertilizers, green manuring, crop rotations, culture, etc.—*A. J. Pieters.*

2132. LANSDELL, K. A. Weeds of South Africa. IV. Dissemination of weeds. Jour. Dept. Agric. Union South Africa 3: 366–372. Fig. 60–64. 1921.—The various methods of seed dispersal are discussed and illustrated and a schedule given of methods by which the seed of common weeds are distributed.—*E. M. Doidge.*

2133. LANSDELL, K. A. Weeds of South Africa V. Jour. Dept. Agric. Union South Africa 3: 456–462. 1921.—This is a continuation of previous articles on the subject [see Bot. Absts. 10, Entry 1828] and deals chiefly with the eradication of weeds by sprays and manures. Certain experiments on weed destruction carried out during 1919–1920 are recounted.—*E. M. Doidge.*

2134. LEMMERMAN, O., UND H. WIESSMANN. Düngungsversuche mit Magnesiumsulfat. [Fertilizing experiments with magnesium sulphate.] Landw. Jahrb. 55: 273–276. 1920.—It was shown that very large applications of magnesium sulphate to rye and barley had no effect on the yield of straw or grain.—*A. J. Pieters.*

2135. LEMMERMAN, O., UND H. WIESSMANN. Versuche über eine etwaige schädliche Wirkung von Sodakalk und Boraxkalk. [Investigations on a possible harmful effect of soda lime and borax lime.] Landw. Jahrb. 55: 277–280. 1920.—The waste lime from borax factories used contained 0.745 per cent B_2O_3 . Rye and potatoes were grown. Marl, soda lime, borax lime, and no lime plots were laid out in triplicate on a field otherwise uniformly fertilized. The various limes were applied at the rate of 4000 pounds per hectare. These forms of lime are said to have had no influence on the yields.—*A. J. Pieters.*

2136. LITTLE, L. G. Sunflowers vs. maize as silage. Agric. Gaz. New South Wales 33: 20. 1922.—Under similar conditions silage yields, in tons per acre, were secured as follows: maize 5, sunflowers 4.5, Sudan grass 2.5, and sorghum 2.3. The quality of silage shown in practical feeding was in the following order: sorghum, sunflowers, maize, and Sudan grass.—*L. R. Waldron.*

2137. LOCHON, JR., VON. Die Grundlagen des deutschen Kartoffelbaues. [The fundamentals of German potato culture.] Mitteil. Deutsch. Landw. Ges. 37: 160–163. 1922.—In this address the author considers problems and methods of culture, harvesting, and marketing.—*A. J. Pieters.*

2138. LOEW, OSCAR. Einige Bemerkungen zu den Kalk-Magnesiaversuchen von D. Meyer. [Some remarks on the lime-magnesia investigations of D. Meyer.] Landw. Jahrb.

50: 705-708. 1921.—This is a criticism of Meyer's work on the effect of lime and magnesia on oats and *Vicia faba* in field cultures, the conclusions of which differ from those reported by Loew.—*A. J. Pieters.*

2139. McCauley, C. Field experiments with winter fodders. Cowra experiment farm. Agric. Gaz. New South Wales 33: 11-12. 1922.—Sunrise and Algerian oats gave highest yields, the former yielding over 11 tons per acre, green weight. The varieties of wheat used proved unsuitable. Canary grass proved very susceptible to take-all.—*L. R. Waldron.*

2140. McLeod, Charles. Indian jute. (*Corchorus* spp.) Asiatic Rev. 17: 302-306. 1921.—Cultivation of jute in India is described with special reference to soils, manuring, seeding, harvesting, and preparation, packing, marketing and uses of the fiber.—*Lyster H. Dewey.*

2141. Mainwaring, C. White and yellow maize. A comparison. Rhodesia Agric. Jour. 18: 612-615. 1921.—Rhodesia has for some years determined to produce only 1 class of maize for export, namely "Flat White." The advantages and disadvantages of this plan are discussed.—*E. M. Doidge.*

2142. Makin, R. N. Sudan grass on the south coast. Agric. Gaz. New South Wales 33: 55. 1922.—Experiments have shown that Sudan grass can not compare with maize or sorghum as silage or ensilage in point of yield for the district and it is not ranked high for pasture.—*L. R. Waldron.*

2143. Mundy, H. G. Annual report of experiments 1920-21. Experiment station, Salisbury. Rhodesia Agric. Jour. 18: 604-612. 1921; 19: 45-52. 3 pl. 1922.—This includes a report on rotation and other experiments with maize, including date of planting, spacing, and seed selection. Other matters considered are sweet potato variety trials, buckwheat, summer oats and wheat for grain production, ground nuts, velvet beans, and hay crops.—*E. M. Doidge.*

2144. Mundy, H. G. Annual report of crop experiments 1920-21. Gweli experiment farm. Rhodesia Agric. Jour. 18: 616-620. 1 pl. 1921.—This report is concerned chiefly with rotation experiments including maize.—*E. M. Doidge.*

2145. Mundy, H. G. Arlington sand veld experiment station. First report. Winter crops 1921. Rhodesia Agric. Jour. 18: 595-599. 1921; 19: 68-72. 4 pl. 1922.—This is a record of experiments carried out on the moisture-retaining vlei soils of the sand veld for the production of winter wheat, rye, barley, oats, and other crops.—*E. M. Doidge.*

2146. Mundy, H. G. Florida beggar weed, (*Desmodium tortuosum*). Rhodesia Agric. Jour. 18: 504-505. 1 pl. 1921.—For some time the Department of Agriculture has recommended beggar weed as a valuable leguminous crop, suitable for green soiling or for grazing. Details concerning cultivation and irrigation are given. From certain experimental plots 6 cuttings were obtained with a total yield of not less than 12,000 pounds.—*E. M. Doidge.*

2147. Nicholson, G., and M. J. E. Squire. Field experiments with cereals. Agric. Gaz. New South Wales 33: 79-87. 1922.—At Nyngan experiment farm 13 varieties of wheat were under trial in 1921. For the early planted trials Gluyas' Early, Canberra, and Gresley gave best results for both hay and grain. Canberra gave best results for both hay and grain in the late planted trials. Results are given from different cultivation experiments, with notes on a few of the varieties. At the Trangie experiment farm the varieties Bomen, Florence, and Hard Federation were the highest yielding varieties for grain and for hay, for both early and mid-season planting.—*L. R. Waldron.*

2148. Nolte, O. Ueber Antagonismus. [Concerning antagonism.] Landw. Jahrb. 55: 237-291. 1920.—Especial reference is made to the work of E. von Wolff in 1866-68, and tables are given showing Wolff's results in replacing 1 chemical with another.—*A. J. Pieters.*

2149. OLIN, W. H. **Cost of producing an acre of potatoes in the San Luis Valley, Colorado.** *Potato Mag.* 4⁸: 12. 1922.—An account on 1 farm in 1921 showed that the cost of production and marketing was about 133 dollars per acre, or about 25 cents a bushel.—*Donald Folsom.*

2150. OOSTHUIZEN, J. DU P. **Cotton: ratooning experiments.** *Jour. Dept. Agric. Union South Africa* 4: 125-131. 4 fig. 1922.—The results of experiments carried out at Rustenburg show that ratooning does not increase the yield of cotton; that there appears to be a difference between the quality of 1st-year and ratooned cotton, the lint from ratooned fields showing signs of deterioration; and that as a general rule ratooned fields are more infested with cotton pests than 1st-year cotton.—*E. M. Doidge.*

2151. PAMMEL, L. H., AND C. M. KING. **Seed analyses of 1913 to 1921.** *Iowa Agric. Exp. Sta. Bull.* 203. 27-43. 1921.—In this period 8,478 samples of seed were submitted to the station for analysis. A list is given of weed seeds occurring in the grain seeds considered. The weed content indicates where the seed was grown. For the most part the seed samples were: red clover, alfalfa, alsike clover, sweet clover, timothy, millet, bluegrass, Sudan grass, brome grass, white clover, lawn grass mixtures, rape, wheat, oats, and miscellaneous commercial seeds. Noxious seeds contained in such quantity in the seed samples as to make them illegal for the state were as follows: Canada thistle, wild mustard, dodder, wild oats, quack grass, and corn cockle. Fungus diseases, such as ergot, are distributed in commercial seed. Foul weed seeds are sometimes spread by screenings. It is recommended that crops for seed production be examined in the field.—*Florence Willey.*

2152. POFF, M. **Die Steigerung der Ernteerträge durch geeignete Boden-Desinfektion.** [Increasing yields by proper soil disinfection.] *Landw. Jahrb.* 55: 549-579. 1921.—After reviewing the literature, the author reports pot and field experiments on the effect of Humuskarbolineum and similar substances. The yields of barley, oats, beets, potatoes, cabbage, carrots, and bush beans were increased, sometimes materially. It was also found that applying 10-15 gm. of Humuskarbolineum per plant controlled *Plasmodiophora* of cabbage except in very badly infested fields. The details of crop weights for each experiment are tabulated.—*A. J. Pieters.*

2153. PRIDHAM, J. T. **Three English wheats.** *Agric. Gaz. New South Wales* 33: 87. 1922.—The 5 English wheat varieties, John Bull, Pedigree Snowdrop White, Harvester, Yeoman, and Fenman have proved unsuitable for conditions in New South Wales.—*L. R. Waldron.*

2154. REYNOLDS, M. H., G. C. SPARKS, AND R. N. MAKIN. **Farmers' experiment plots. Potato experiments, 1920-1921.** *Agric. Gaz. New South Wales* 33: 27-35. 1 fig. 1922.—In the New England district 10 farmers cooperated and 10 varieties were tested. Varieties Surprise and Coronation gave best results. Manuring showed no immediate beneficial effect due to dry weather at a critical period. In the southern district 4 farmers cooperated and 13 varieties were tested. Best results were secured from the Factor variety. In the southern highlands, Factor and Magnum Bonum gave most satisfactory results. Detailed results are tabulated.—*L. R. Waldron.*

2155. RINDL, M. **Ground nuts as a source of oil.** *South African Jour. Indust.* 5: 38-45. 1922.—This article is written with the view of encouraging the growing of ground nuts (*Arachis hypogaea*) in the Union of South Africa, particularly in the warmer parts of Natal and the Transvaal. Statistics of the production of this crop in Rhodesia, prices, and best methods of planting, etc., are given.—*S. M. Stent.*

2156. RINDL, M. **Ground nuts as a source of oil: 2.** *South African Jour. Indust.* 5: 86-90. 1922.—The commercial value of ground nuts (*Arachis hypogaea*) is discussed. Analyses are given of the oils of different varieties grown in different localities. A note on the Bambarra ground nut, *Voandzeia subterranea*, which has no value as an oil-producer, is included.—*S. M. Stent.*

2157. ROSA, J. T. JR. Seed studies with Irish potatoes. Missouri Agric. Exp. Sta. Bull. 191. 32 p. 1922.—Variety and strain tests over 4 years indicate that Early Ohio and Irish Cobbler are the only varieties adapted for the spring crop in Missouri. Several varieties were found suitable for the fall crop. A wide range in productivity between different strains of the same variety is reported. Certified potatoes from northern and western states are recommended for seed. Home-grown seed potatoes of the fall crop approached northern grown seed in quality and yield, producing a much smaller percentage of cull potatoes than spring-grown seed of the same varieties. Greening and sprouting seed potatoes reduced the yield. Total yield increased with the size of the seed-piece planted, but the most profitable size was little beyond 1 ounce. Cut seed gave better yields of No. 1 potatoes than the whole tuber. The average number of tubers per stalk tends to be a varietal characteristic but may be affected markedly by soil and weather conditions.—*L. J. Stadler*.

2158. ROSENFELD, ARTHUR H. Big yields and more technical supervision. Internat. Sugar Jour. 24: 131-132. 1922.—Technical supervision of the cane-fields is advocated.—*C. Rumbold*.

2159. ROSENFELD, ARTHUR H. The question of the distance between cane rows. Internat. Sugar Jour. 24: 72-76. 1922.—A brief résumé is given of the results of field experiments on the effect on the sugar tonnage per hectare of varying distances between the rows of sugar cane. The distance between the rows was varied from 3 to 8 feet. W. C. Stubbs in Louisiana found that with Louisiana Striped and Purple cane (Cheribon) rows 5 feet apart gave best results. In Hawaii R. E. Blouin's experiments with Lahaina cane planted at 4, 5, 6 and 8 feet showed that 5-foot rows are best. Reynoso says $5\frac{1}{2}$ feet is the ideal distance in Cuba, and Boname, that $4\frac{1}{2}$ -5 feet is best in Guadeloupe. Large station experiments with various canes in Tucuman Province, Argentina, carried on by Blouin, W. E. Cross, and Rosenfeld from 1910 to 1919, showed that sugar cane should be planted in rows as close together as is consistent with proper machine cultivation. This distance is about 5 feet for the thick type of cane such as Cheribon, Lahaina, etc., and from $5\frac{1}{2}$ to 6 feet for the more abundantly suckering types such as the Java canes, the Uba, and the Bamboo class.—*C. Rumbold*.

2160. ROTHGEB, BENTON E., AND JOHN B. SIEGLINGER. Broom-corn experiments at Woodward, Okla. U. S. Dept. Agric. Bull. 836. 53 p., 7 fig. 1920.—The 5-year results obtained from varietal and cultural experiments with broom-corn at Woodward, Oklahoma, show that all varieties produce high yields in favorable seasons, but only adapted varieties yield well in less favorable seasons. Dwarf broom-corn made higher yields than the standard broom-corn because it is better adapted to prevailing conditions. Both groups tend to produce suckers, but the tendency is greater in the dwarf than in the standard. Environmental conditions largely influence suckering and the length and quality of the brush. Thick stands produce short brush, thin stands long coarse brush. The best dates for planting proved to be the 1st half of May or the last half of June, as these dates enabled the crop to head either before or after the usually dry, hot weather about the middle of August. Plants 6-8 inches apart in rows $3\frac{1}{2}$ feet apart gave best results. Nothing was gained by spacing the rows 7 feet apart and doubling the number of plants in the row, giving the same number of plants to a given area. Harvesting when the seed were in the dough stage gave a higher yield and better quality of brush than that harvested earlier.—*Benton E. Rothgeb*.

2161. ROWNEY, L. F. Rate-of-seeding experiment with maize. Agric. Gaz. New South Wales 33: 38. 1922.—At Grafton in 1921, with rainfall above the average, maize planted in rows 8 feet apart yielded less than maize planted in rows 5 feet apart.—*L. R. Waldron*.

2162. RUDKIN, S. Harvest report, 1921. Nyngan experiment farm. Agric. Gaz. New South Wales 33: 95-96. 1922.—Yields of wheat for grain, hay, and silage are given for the various fields of the Nyngan experiment farm.—*L. R. Waldron*.

2163. RÜMKER, K. VON. Die Saatenanerkennung, ihre augenblickliche Lage und ihre Bedeutung für die landwirtschaftliche Produktion. [Seed certification, its present status and its significance in agricultural production.] Mitteil. Deutsch. Landw. Ges. 37: 207-210. 1922.—The author reviews the history of the efforts of the German Agricultural Society to promote seed improvement, and to organize for the production of pedigreed seed. He points out that a register of pedigreed stock to be of value must be national as separate provincial registers would create confusion. He also urges the establishment of certain outlined rules and principles, and that seed certification be carried on by voluntary associations rather than through governmental agencies.—A. J. Pieters.

2164. SCHERFFIUS, W. H. The future of the tobacco industry in South Africa. Jour. Dept. Agric. Union South Africa 4: 224-227. 1922.—The future of the tobacco industry in South Africa involves several questions. Some serious troubles are developing in the up-country districts, the tobacco slug or beetle (*Lema bilineata* Germar) is becoming a serious pest, and even more serious is the occurrence of wild fire and angular spot (*Bacterium tabacum* and *B. angulatum*). The tobacco industry will never assume large proportions until cooperation is practised more extensively and more consideration is given to obtaining an overseas market.—E. M. Doidge.

2165. SCHNEIDEWIND, W., D. MEYER, UND F. MÜNTER. Kaliversuche. [Potash investigations.] Landw. Jahrb. 55: 40-45. 1921.—The effects of chlorate of potash, potassium sulphate, Phonolith, Vulcan-phonolith, and Leuzit on potatoes, fodder beets, and oats in various soil types are tabulated and discussed.—A. J. Pieters.

2166. SCHNEIDEWIND, W., D. MEYER, UND F. MÜNTER. Phosphorsäureversuche. [Phosphoric acid investigations.] Landw. Jahrb. 55: 21-39. 1921.—Tables are given containing results with Thomas-meal and superphosphate on oats and beans, and with Thomas meal only on oats, white mustard, and rye grass, in some cases both with and without lime. The results are briefly discussed.—A. J. Pieters.

2167. SCHNEIDEWIND, W., D. MEYER, UND F. MÜNTER. Vergleichende Versuche mit Natronsalpeter, Kalksalpeter (Norgesalpeter) und Kalknitrit. [Comparative investigations with sodium nitrate, calcium nitrate, and calcium nitrite.] Landw. Jahrb. 55: 1-20. 1921.—The results of tests on sand, sandy loam, and clay with oats, potatoes, and fodder beets are reported in tabular form and briefly discussed.—A. J. Pieters.

2168. SCHURIG. Neure Erfahrungen im Zuckerrübenbau. [Recent experiences in sugar beet culture.] Mitteil. Deutsch. Landw. Ges. 37: 220-223. 1922.—These are personal practical experiences in sugar beet culture.—A. J. Pieters.

2169. SCOFIELD, C. S. Effect of alfalfa on the subsequent yields of irrigated field crops. U. S. Dept. Agric. Bull. 881. 13 p. 1920.—The effect of alfalfa, grown for 2 or 3 years in a rotation, on subsequent yields of Irish potatoes, oats, and sugar beets grown under irrigation has been tested for 6 years at 3 stations in the northern Great Plains. At Scottsbluff, Nebraska, where the soil is a light sandy loam, the alfalfa has increased the yield of potatoes about 100 bushels per acre and the proportion of marketable tubers 12 per cent, the yield of oats 6 bushels per acre, and that of sugar beets 3.4 tons per acre. At Belle Fourche, South Dakota, where the soil is a heavy clay loam rich in organic matter, alfalfa has had no beneficial effect on potatoes and that on oats and sugar beets has been insignificant. At Huntley, Montana, on productive clay loam alfalfa has increased the yield of potatoes about 50 bushels per acre without, however, increasing the proportion of marketable tubers, which has been relatively high on all plots. The alfalfa apparently increased the yield of oats about 11 bushels per acre and of sugar beets 1.5 tons per acre. At Scottsbluff alfalfa proved more beneficial to potatoes than did farm manure. With other crops and at the other stations the differences were less striking and generally in favor of the farm-yard manure.—H. L. Westover.

2170. SELLERGREN, GUSTAF. *Inhemska fibervaxter: Linum usitatissimum*. [Native fiber plants.] K. Landbr.-Akad. Handl. o. Tidskr. 5: 388-424. 13 fig. 1921.—*Linum usitatissimum* is the only species of *Linum* which produces fibers suitable for spinning. Flax was brought to Sweden in the latter part of the stone age. A study of the plant, illustrated, shows that the root contains no fiber; the stem just above the root contains coarse fibers lignified; the middle and upper portions finer fibers, less lignified and forming a greater proportion of the total cross section. Two types are described,—type A (seed flax) with numerous branches and root about $\frac{1}{3}$ the length of the stem, and type B (fiber flax) with few branches and root about $\frac{1}{10}$ the length of the stem. The proportion of short fibers forming tow is increased from 50 to more than 70 per cent by fertilizing sandy soil with humus. Microscopic studies show that nitrogenous fertilizers produce coarser ultimate cells in the fiber bundles with wider spaces between the cells. The method of "cottonized flax" (the separation into ultimate cells for spinning) is discussed at length with the conclusion that it is not feasible. Dew-retting, water-retting, and bacterial retting, and special processes are discussed.—It is pointed out that the fine cross lines of the ultimate fiber cells often mentioned as characteristic of flax are not inherent in the fiber, but result from sharp bending in preparing the fiber.—Flax cells from mummy wrappings more than 3,000 years old resemble the present flax, but are finer.—The walls of cells composing flax fibers are themselves composed of extremely fine filaments.—Standardizing the grades of flax is strongly urged and suggestions for grades are given.—L. H. Dewey.

2171. SELLSCHOP, JACQ. P. F. Maize growing competition for lads, Transvaal Province, 1920-1921. Jour. Dept. Agric. Union South Africa 4: 246-251. 1922.—Prizes for maize growing were offered to lads in the High Veld, Middle Veld, and Low Veld areas. There were 86 entries for the competition, and the results are given in detail.—E. M. Doidge.

2172. SHEPHERD, A. N. Farmers' experiment plots. Winter green fodder trials, 1920-1921. Murrumbidgee irrigation areas. Agric. Gaz. New South Wales 33: 89-91. 1922.—Oats, barley, and vetches gave higher yields than wheat. Yields were increased by use of various manures.—L. R. Waldron.

2173. SHRADER, J. H. The castor-oil industry. U. S. Dept. Agric. Bull. 867. 40 p., 15 fig. 1920.—This bulletin includes a discussion of the source of castor oil, statistics of the trade and commerce in castor beans and castor oil for the years 1910-1918, an illustrated description of the processes involved in the manufacture of castor oil, including solvent extraction, data on the analysis of castor oils from different sources, and an account of the various uses of castor oil.—W. W. Stockberger.

2174. SMIT, B. J. The uses of tobacco waste. Jour. Dept. Agric. Union South Africa 4: 267-271. 1922.—Considered solely as a fertilizer, tobacco would at present be worth less than 1d. per pound. During the process of manufacturing tobacco extract most of the fertiliser constituents are removed, making the residue of little value.—E. M. Doidge.

2175. SNELL, K. Systematik der Kartoffelsorten. [Taxonomy of potato varieties.] Fühl-ing's Landw. Zeitg. 70: 14-19. 1921.—This is a discussion of the identification and classification of potato varieties according to certain plant characters other than the peculiarities of the tubers, including the color of daylight sprouts, color of blossoms, stems, and leaves and form and character of leaf. The author holds that color distinctions in daylight sprouts, such as light green, light green and reddish-violet or bluish-violet, are maintained in the blossoms and that varieties and types can thus be distinguished in seed stock. It is held that the identification and purification of varieties by the recognition of systematic plant characters is important in the development of varieties possessing certain desirable qualities.—A. T. Wiancko.

2176. SOLOMON, X., ET G. VERNET. Valeur alimentaire des fruits de *Pithecolobium saman* Benth. [The food value of the fruits of *Pithecolobium saman*.] Bull. Agric. Inst.

Sci. Saigon 3: 193-196. 1920.—Chemical analyses of the different parts of the pods are given and the forage value of the fruits is discussed.—*E. D. Merrill.*

2177. SPARKS, G. C., AND R. N. MAKIN. Farmers' experiment plots. Maize experiments, 1920-1921. Agric. Gaz. New South Wales 33: 7-9. 1922.—In the southern district a number of farmers cooperated in growing a total of 20 varieties of corn. Maximum yields of over 90 bushels per acre were secured. On the south coast corn planted for ensilage yielded up to 15 tons per acre.—*L. R. Waldron.*

2178. STADLER, L. J. Experiments in field plot technic for the preliminary determination of comparative yields in the small grains. Missouri Agric. Exp. Sta. Res. Bull. 49. 78 p. 1922.—Studies on varietal competition, size for replication of plots and the adjustment of yield by the use of check plots in 8 variety and strain tests of wheat, barley, and oats are reported. The varieties were grown in replicate 5-row blocks. The competing border rows of adjacent sorts gave relative yields widely different from those of interior rows of the same plots. Such competitive effects were greater between different varieties than between different commercial strains of the same variety. A considerable error from competition was noted in tests in which the rows ran north and south as well as in those in which the rows ran east and west. In general, higher yielding varieties were favored in competition, but the reverse frequently occurred. In oats tests quality was most closely related to earliness of heading and maturity, but was also related to yield. In wheat tests quality was related fairly closely to both yield and earliness, and in barley tests it was not significantly correlated with any of the characteristics studied. A significant correlation between competition and height was found in 1 wheat variety test. Competition showed no relation to grain-straw ratio. Three-row plots with border rows discarded were somewhat more variable than 5-row plots with border rows discarded, but the differences were not sufficient to outweigh the advantage in size. Plot variability was greater with increase in the size of the experiment field. The variability of 120 distributed check plots of Kherson oats differed widely from that of 120 distributed plots of Red Rustproof oats adjacent in each case to the Kherson plots.—Adjustment of plot yields on the basis of the yields of check plots was effective on 3 fields, characterized by high plot variability, and was ineffective on 5 fields, characterized by low plot variability. In the test in which both Kherson and Red Rustproof were used as check varieties, the Kherson check plots were more effective for adjusting the yields of the Kherson strains tested, whereas the Red Rustproof check plots were more effective for adjusting the yields of the Red Rustproof strains tested. The relative variability of different parts of the fields as determined by these 2 check varieties differed greatly and the correlation between the yields of adjacent Kherson and Red Rustproof check plots was not statistically significant.—*W. C. Etheridge.*

2179. STENT, SYDNEY M., AND H. A. MELLE. Fodder and pasture grasses of South Africa. III. Star grass. Jour. Dept. Agric. Union South Africa 3: 271-276. Fig. 1-4. 1921.—Star grass, *Cynodon plectostachyum*, is indigenous to British East Africa; it is a perennial, with a prostrate or ascending habit, more erect than Kikuyu, but not equalling the latter's strong root system. It makes a very soft, sweet-smelling hay and according to chemical analysis it has a higher feeding value than any grass known. Its growing period is from October to the end of March, it requires a long warm season, a good soil, and a heavy rainfall to grow to perfection, and is one of the first grasses to be affected by the cold weather; but given suitable conditions it grows faster than Kikuyu.—*E. M. Doidge.*

2180. STEWART, GEORGE. A variety survey and descriptive key of small grains in Utah. Utah Agric. Exp. Sta. Bull. 174. 35 p., 11 fig. 1920.—Several tables give lists of the varieties of small grains found in a field survey of Utah in 1918 and 1919. Oats were nearly standardized to the Swedish Select variety, and barley to the Coast variety. In the case of wheat, 24 varieties were found and these usually mixed with other varieties. A study of the market grades for the 1917, 1918, and 1919 crops likewise shows much "mixed wheat." Keys to the local varieties of wheat and oats are included, with a description of each. Comparative yields show Turkey Red to be the best variety of winter wheat and Dicklow and New Zealand the best spring

irrigated varieties. Sevier, a new wheat found during the survey, has in 1 year's test out-yielded all other spring wheats.—*B. L. Richards.*

2181. STUTZER, A. Schwefelsaures Ammoniak. [Sulphate of ammonia.] Mitteil. Deutsch. Landw. Ges. 37: 211-213. 1922.—The author points out that considerable quantities of sulphuric acid are left in soils when heavy applications of ammonium sulphate are made, referring especially to the practice of topdressing meadows and pastures in order to induce early and heavy growths of grass. He warns of the danger of injuring the fields by excessive acidity if this practice is employed with certain grasses.—*A. J. Pieters.*

2182. TAYLOR, H. W. Common mistakes in growing and handling Virginia tobacco. Rhodesia Agric. Jour. 19: 37-44. Pl. 1-2. 1922.—Methods in vogue in Rhodesia in connection with seed beds, transplanting, fertilizing, topping, harvesting, and curing are criticized and improvements suggested.—*E. M. Doidge.*

2183. TAYLOR, H. W. Notes on the tobacco industry. South African Jour. Indust. 4: 885-889. 1921.—This article is a general review of the tobacco industry as applied to South African needs and conditions. The desirability of acquiring more knowledge on the subject of insect and fungoid diseases of the crop is discussed, also the difficulties experienced by farmers in obtaining direct instruction to improve their methods. Great stress is laid on the growing importance of the industry in South Africa, not only for the production of tobacco for local consumption but also for exportation. In 1912 the exports of tobacco were valued at £24,218 and in 1919 they had increased to £157,460.—*S. M. Stent.*

2184. TAYLOR, H. W. The culture of Turkish tobacco. 1. South African Jour. Indust. 4: 794-799. Pl. 1. 1921.—The climate and soil suitable for culture of Turkish tobacco are discussed. Areas in South Africa where it has become established as a commercial crop are noted, and cultural methods are given in detail from the preparation of the seed bed to harvesting. The stringing and wilting of the leaves is also described.—*S. M. Stent.*

2185. TAYLOR, H. W. The culture of Turkish tobacco. 2. South African Jour. Indust. 4: 856-863. Pl. 2-7. 1921.—In this article is described the curing of the tobacco, treatment after curing, and grading and baling for shipment. Also a list is given of necessary equipment and the approximate cost of production.—*S. M. Stent.*

2186. TAYLOR, H. W. The curing of tobacco. South African Jour. Indust. 4: 727-732. 1921.—An account is given of the various methods of curing tobacco and the types of tobacco cured by each method. The methods described are air-curing, sun-curing, fire-curing, and flue-curing. Of these the 1st is most generally used, as it is simplest and easiest, but, like sun-curing, it is subject to adverse climatic conditions. Fire-curing imparts a peculiar flavor and aroma to the leaf and is not used in South Africa. Flue-curing is the most modern and scientific method. General directions are given for this method, which the grower can modify to suit his particular conditions.—*S. M. Stent.*

2187. TORNAU. Die Bedeutung des Lupinenbaues für den landwirtschaftlichen Betrieb. [The importance of lupine culture in farm management.] Mitteil. Deutsch. Landw. Ges. 37: 236-241. 1922.—In this address the author reviews the history of lupine culture and points out the value of lupines for green manuring and for the production of high protein feeds.—*A. J. Pieters.*

2188. TORNAU. Ein Beitrag zur Frage erblicher Beeinflussung durch äussere Verhältnisse. [A contribution to the question of the influence of environment upon inheritance.] Fühling's Landw. Zeitg. 70: 121-127. 1921.—The author reports comparative trials, under like conditions, of seeds of peas and barley grown continuously for 16 years on (1) well fertilized land and (2) on unfertilized to determine whether the long period of growth under favorable and

unfavorable conditions in each case had affected the relative yielding power. Both kinds of seeds were grown in pots under 2 sets of controlled conditions—fertilized and unfertilized—during the years 1919 and 1920. In the case of peas, the well nourished and the poorly nourished seed gave approximately the same results in both the fertilized and unfertilized pots. In the case of barley, the well nourished seed gave higher yields than the poorly nourished seed in the unfertilized pots, whereas in the fertilized pots there were no appreciable differences. The results are regarded as inconclusive in that it could not be determined whether the seeds represented pure lines or merely mixed populations.—*A. T. Wiancko.*

2189. TOWNSEND, C. O. **The beet-sugar industry in the United States in 1920.** U. S. Dept. Agric. Bull. 995. 58 p., 10 pl. 1921.—This general treatise on all phases of beet-sugar production in the United States includes a history of the industry, various phases of sugar beet culture, and economic problems affecting the industry.—*John A. Elliott.*

2190. TROWBRIDGE, P. F. **Spring wheat in the northwest.** Proc. Ann. Meeting Soc. Promotion Agric. Sci. 40/41: 42-47. 1919-20 [1921].—The author, after reviewing the history of the introduction and use of spring wheat in the Northwest [U. S. A.] and the origin and development of some of the well known varieties of the past, gives a critical description of some popular strains of hard spring wheats grown at the present time.—*Lyman Carrier.*

2191. WALTERS, J. A. T. **The velvet bean.** Rhodesia Agric. Jour. 19: 21-28. 3 pl. 1922.—The velvet bean is without exception the most important leguminous crop in Rhodesia. Directions are given for cultivation and harvesting, also details of experiments in which the velvet bean has been used as a rotation legume with maize and particulars as to the value of the crop as a stock feed.—*E. M. Doidge.*

2192. WARBURTON, C. W., AND T. R. STANTON. **Experiments with Kherson and Sixty Day Oats.** U. S. Dept. Agric. Bull. 823. 72 p., 15 fig. 1920.—This is a compilation of result from varietal experiments with oats, including Kherson and Sixty-Day, which have been conducted under a wide range of soil and climatic conditions in periods varying from 4 to 14 years. Histories and descriptions of the 2 varieties are included, also brief notes on yields of straw, weight per bushel, percentage of hull, and improvement. A general consideration of the numerous data tabulated indicates that the early varieties, Kherson and Sixty-Day, yield well in most of the spring-oat sections of the U. S. A. At more than 50 per cent of the stations, under a wide range of environmental conditions, early varieties have produced higher yields than mid-season and late varieties. Kherson and Sixty-Day have given the best results in the warmer humid, sub-humid and semi-arid sections. Late varieties outyielded mid-season varieties at only a few stations.—*T. R. Stanton.*

2193. WEIRUP. **Anbauversuche mit Bohnen im Jahre 1921.** [Tests of beans in 1921.] Mitteil. Deutsch. Landw. Ges. 37: 178-181. 1922.—The author reports yields of 5 varieties of pole and 3 of bush beans at each of 4 stations.—*A. J. Pieters.*

2194. WHITING, A. L., AND T. E. RICHMOND. **Sweet clover for nitrate production.** Illinois Agric. Exp. Sta. Bull. 233. 255-267. 1921.—The author discusses the characteristics which make sweet clover a valuable green-manure crop, and the studies of other investigators on sweet clover as a green manure. Sweet clover when grown in Illinois on brown silt loam and on gray clay and ploughed under as a green manure for corn, furnishes a large amount of nitrate nitrogen.—*J. H. Lovell.*

2195. WHITTET, J. N. **Bushel weights of sorghum and Sudan grass seed.** Agric. Gaz. New South Wales 33: 93-94. 1922.—Bushel weights in pounds were determined as follows: milo 57, feterita 56, Manchukao 56, Sudan grass 43, early amber cane 47, and saccaline 56.—*L. R. Waldron.*

2196. WHITTET, J. N. **Kikuyu grass (*Pennisetum clandestinum*) in Queensland.** Agric. Gaz. New South Wales 33: 35. 1922.—This grass made good growth even during the winter. Up to the present it has shown no indication of head formation in New South Wales.—*L. R. Waldron.*

2197. WIESSMANN, H. **Düngungsversuche mit Eisensulfat.** [Fertilizer experiments with iron sulphate.] Landw. Jahrb. 55: 281-286. 1920.—Iron sulphate applied to winter rye and summer barley at the rate of 200 pounds per hectare slightly decreased the yields, but the differences were too small to warrant any positive conclusions.—*A. J. Pieters.*

2198. WILLARD, C. J., AND L. E. THATCHER. **Experiments with Hubam clover.** Monthly Bull. Ohio Agric. Exp. Sta. 7: 3-18. Fig. 1-7. 1922.—The article compares Hubam clover and biennial sweet clover. Experiments have shown that the annual sweet clover will yield 1-2 tons per acre following a grain crop, only slightly out-yielding the biennial, while the hay of the latter is of much better quality. If the Hubam is sown alone in April, 2 cuttings of hay may be secured, though considerable trouble from weeds may be expected if care is not taken. The protein value of Hubam clover was found to be less than that of the biennial variety. They were found equally sensitive to acid soils. The percentage of nitrogen in the roots of the biennial sweet clover was 4 times that of the Hubam, and the weight of roots to a depth of 1 foot was 7 times greater in the biennial; furthermore, 30 times as much nitrogen per acre was found in the roots of the biennial white sweet clover as in the Hubam. Bee keepers have found Hubam clover valuable as a nectar-secreting plant. The experiments do not show that the Hubam clover is likely to be of much value in the ordinary farm rotation in Ohio.—*R. C. Thomas.*

2199. WOODHOUSE, T., AND P. KILGOUR. **The jute industry from seed to finished cloth.** 133 p., 50 fig. Sir Issac Pitman & Sons, Ltd.: London, 1921.—Jute fiber, now one of the 5 main textile fibers, was first imported into Great Britain in 1822. The cultivation of *Corchorus capsularis* and *C. olitorius*, the retting and preparation of the fiber, and methods of sorting and baling are briefly described. Statistics are given. The remaining portion of the book is devoted mainly to a discussion of mill operations from opening the bales to the finished Hessians or gunnies.—*Lyster H. Dewey.*

2200. WRIGHT, R. C., AND GEORGE F. TAYLOR. **Freezing injury to potatoes when undercooled.** U. S. Dept. Agric. Bull. 916. 15 p., 1 fig. 1921.—The results of a study of freezing injury to 7 commercial Irish potato varieties indicate that potatoes can be undercooled several degrees below their true freezing point without freezing injury, provided there is no ice formation within the tissue. When potatoes are thus undercooled, a more or less slight jar is liable to cause freezing or ice formation. When freezing commences in an undercooled potato, the temperature quickly rises to its true freezing point and remains there for a varying length of time, depending upon the surrounding temperature. Some varieties seem to freeze more readily than others when undercooled.—*R. C. Wright.*

2201. WRIGHT, WILLIAM H. **Beneficial results from the inoculation of canning peas with legume bacteria.** [Abstract.] Absts. Bact. 5: 9. 1921.

2202. ZADE. **Züchtung auf Halmfestigkeit.** [Selection for stiffness of straw.] Fühling's Landw. Zeitg. 69: 449-457. 1920.—This is a discussion of the factors concerned in the lodging of grain crops such as wheat and oats, and a report of tests of methods of determining stiffness of straw for purposes of improvement by selection. It is pointed out that lodging may occur quite independent of stiffness of straw. It may be caused by excessive softening of the ground during rain storms, thus loosening the root hold, especially if the plant has a shallow or weak root development. Length of straw and extent of leaf surface are also important factors. Thickness of straw or of the stem wall are not regarded as important or reliable indications of ability to withstand lodging. Measurements of the ability of the stem to withstand bending

and observation of the strength of root development are regarded as the best guides to improvement by selection. Tests of plants to withstand bending were made on the stem at blossoming time, when the grain was in the milk, and after harvest, using Kraus' apparatus, to determine whether or not correct conclusions could be drawn from tests made on the ripe straw. It was supposed that tests made on the green stem might possibly be a better guide in selection for stiffness, but it was found that tests made on the ripe straw after harvest were fully as trustworthy as tests made on the green stems.—*A. T. Wiancko.*

2203. ZOOK, L. L. *Winter wheat in western Nebraska.* Nebraska Agric. Exp. Sta. Bull. 179. 37 p., 8 fig. 1922.—This bulletin reports the effects of 4 different crop sequences on the yields of winter wheat at 4 experiment stations in the Great Plains area, namely, North Platte, Nebraska, Scottsbluff, Nebraska, Akron, Colorado, and Ardmore, South Dakota. The 4 treatments are: (1) continuous cropping to winter wheat; (2) winter wheat alternating with corn; (3) winter wheat on summer tilled ground; (4) winter wheat on land upon which rye or peas had been plowed under for green manure. Correlating the precipitation, evaporation, and wheat yields with the various treatments, the author concludes that the chief limiting factor in crop production in western Nebraska is insufficient rainfall. Winter wheat, by making its greatest growth during the period of greatest average rainfall and before the time of largest evaporation losses, makes especially economical and efficient use of the moisture available. Lowest average yields per acre, at all stations, were secured from continuous cropping. Yields of wheat following corn have been good at all stations. The highest yields per acre have been those following summer tillage. At 3 of 4 stations less total wheat was produced by summer tilling half of the land than by continuous cropping of all the land to wheat. Allowing for savings in seed and in seeding and harvesting costs from summer tilling, the average profits from summer tilling and continuous cropping to wheat have been about equal. Higher yields of winter wheat per acre have been secured after summer tillage than after corn; but, allowing for the value of the corn produced, the most profitable wheat yields have been those following corn. Averaging the results from all tests at all stations, in comparing the yield of wheat produced after summer tillage with those produced after corn, each additional bushel produced after summer tillage cost an equivalent of 4.9 bushels of corn produced under the corn-wheat rotation.—Plowing under rye or peas for green manure failed to increase average yields over those following summer tillage, and proved to be the least profitable of the methods tested. The average soil moisture content in the spring was greater following summer tillage than following either corn or wheat, and greater following corn than following wheat. This difference is the chief cause of yield divergences in the various methods. In tests of winter wheat varieties at North Platte and Akron, the most promising variety has been Kanred.—*T. A. Kiesselbach.*

BIBLIOGRAPHY, BIOGRAPHY, AND HISTORY

C. W. DODGE, *Editor*

(See also in this issue Entries 2067, 2170, 2190, 2287, 2329, 2436, 2514, 2679, 2680, 2681, 2752, 2949, 3040, 3163, 3187)

2204. ANONYMOUS. *Bibliographija.* [Bibliography.] Želmenija 1: 4. 1921.—This short bibliography of works relating to Lithuanian and English plant names is followed by a list of abbreviations.—*C. W. Dodge.*

2205. ANONYMOUS. *Note.* Nature 109: 51. 1922.—Sir David Prain will soon retire from the post of Director of the Royal Botanic Gardens, Kew, which he has held since 1905. From 1884 to 1905 he was curator of the herbarium at Sibpur, Calcutta. He will be succeeded at Kew by Dr. A. W. Hill, assistant director for the last 14 years.—*O. A. Stevens.*

2206. ANONYMOUS. *Obituary.* Nature 106: 669. 1921.—This is a brief account of the life of William Harris (1860–1920), who was Government Botanist in Jamaica, where he spent 39 years.—*O. A. Stevens.*

2207. ANONYMOUS. [Rev. of: COMMITTEE OF THE BRITISH SCIENCE LEAGUE. *A catalogue of British scientific and technical books.* xvii + 376 p. 6 John St., London.] *Jour. Botany* 60: 58-59. 1922.

2208. ANONYMOUS. [Rev. of: HEDRICK, U. P. *Sturtevant's notes on edible plants.* Rept. New York Agric. Exp. Sta. [Geneva] 1919²: 17-686. 1919 (1920). (See Bot. Absts. 8, Entry 862).] *Jour. Botany* 60: 91-92. 1922.

2209. ANONYMOUS. [Rev. of: LEE, IDA (MRS. CHARLES BRUCE MARRIOTT). *Captain Bligh's second voyage to the South Sea.* xvi + 290 p., maps and illus. Longmans: London, 1920.] *Jour. Botany* 60: 22-25. 1922.

2210. BARNHART, JOHN HENDLEY. *Biographical notices of persons mentioned in the Schweinitz-Torrey correspondence* [see Bot. Absts. 11, Entry 2245]. *Mem. Torrey Bot. Club* 16: 290-300. 1921.—Short biographical sketches of the following are given: William Baldwin (1779-1819), Joseph Barratt (1797-1882), Lewis Caleb Beck (1798-1853), Samuel Elisée von Bridel-Brideri (1761-1828), Samuel Niklas Casström (1763-1827), Zaccheus Collins (1764-1831), Solomon White Conrad (1779-1831), Dennis Cooley (1789-1860), William Cooper (1798-1864), Peter Friedrich Cürrie (1777-1855), William Darlington (1782-1863), Emerson Davis (1798-1866), James Ellsworth DeKay (1792-1851), Alire Raffeneau Delile (1778-1850), Christian Frederick Denke (1775-1838), Chester Dewey (1784-1867), David Bates Douglass (1790-1849), Thomas Drummond (1780-1835), Amos Eaton (1776-1842), James Eights 1798-1882), Stephen Elliott (1771-1830), Eugene Alexander Frueauff (1806-1879), Hezekiah Gates, Benjamin Daniel Greene (1793-1862), Abraham Halsey (1790-1857), Edward Hitchcock (1793-1864), Eli Ives (1779-1861), Edwin James (1797-1861), John Eatton LeConte (1784-1860), Lewis Leconte (1782-1838), Ignaz Ludwig Paul von Lederer (1769-1849), Charles Alexandre LeSueur (1778-1846), William Maclure (1763-1840), Jean Baptiste Ricord-Madianna (1787-1827), André Michaux (1746-1802), François André Michaux (1770-1855), Elisha Mitchell (1793-1857), Gotthilf Henry Ernest Muhlenberg (1753-1815), Thomas Nuttall (1786-1859), William Oakes (1799-1848), James Gates Percival (1795-1856), Perrin, Charles Pickering (1805-1878), Zina Pitcher (1797-1872), William Prince (1766-1842), Frederick Pursh (1774-1820), Constantine Samuel Rafinesque (1783-1840), Thomas Say (1787-1834), Lewis Saynish, Christian Friedrich Schwägrichen (1775-1853), John Scouler (1804-1871), Benjamin Silliman (1779-1864), Grant Thorburn (1773-1863), Jeremiah van Rensselaer (1793-1831), Jacob van Vleck (1751-1831), William Henry van Vleck (1790-1853), Nathaniel Wallich (1786-1854), Robert Wight (1796-1872).—*C. W. Dodge.*

2211. BORZA, AL. *Bibliographia botanica Romaniae annorum 1914-1920.* [Botanical bibliography of Roumania for the years 1914-1920.] *Bull. Inform. Grad. Bot. si Muz. Bot. Univ. Cluj* 1: 41-54. 1921.

2212. BORZA, AL. *Bibliographia botanica Romaniae anni 1921 cum nonnullis additamentis ad bibliographiam annorum 1914-1920.* [Botanical bibliography of Roumania for 1921, with additions to the bibliography for the years 1914-1920.] *Bull. Inform. Grad. Bot. si Muz. Bot. Univ. Cluj* 1: 87-91. 1921.

2213. [BUTLER, E. J.] *Notices.* *Rev. Appl. Mycol.* 1: cover p. iii. 1921.—The Review of Applied Mycology is a new abstracting journal appearing monthly since January, 1922. It will form a companion series to Review of Applied Entomology and will cover the general field of plant pathology, exclusive of diseases caused by animals, and of other aspects of applied mycology. The abstracts are sufficiently detailed to enable isolated workers with meagre library facilities to keep informed of the progress of current work.—Subscription price 12 s. per annum from The Editor, Imperial Bureau of Mycology, Kew, Surrey.—*D. Reddick.*

2214. CALVINO, EVA MAMELI DE. *La mujer en los institutos científicos de Pavia, Italia.* [Women in the scientific institutions of Pavia, Italy.] *Rev. Agric. Com. y Trab.* [Cuba]

4: 602-604. 6 pl. 1921.—Biographical sketches are presented of the following: Rina Monti, director of the Institute of Zoology; Amalia Coppa, assistant and preparator in the same institution; Eva Mameli de Calvino, assistant professor of the Botanical Institute; Maria Barbaini, assistant preparator in the cryptogamic laboratory of the same institution; Anna Vivanti, technical assistant in the Institute of Comparative Anatomy; Piera Marangoni, assistant in the Institute of General Chemistry; Costanza Baccadora, assistant in the Institute of General Pathology and Histology. Brief mention is made of the following Italian women botanists: Margarita Saluzzo, Cándida Perpentì, Elisabetta Fiorini-Mazzanti, Amalia Moretti Fogia, Maria Antonia Mirabella, Angela Nardo-Cibele, Carolina Corone-de-Berti, Baroness Turco-Lazzari, and Vittoria Altoviti-Avila.—*G. R. Hoerner.*

2215. CATTELL, J. McKEEN, and DEAN R. BRIMHALL. *American men of science, a biographical directory.* 3rd. ed., viii + 808 p. The Science Press: Garrison, New York 1921. \$10.—This volume furnishes a fairly complete list of living American scientists, containing the following information about each of over 9,500 persons: full name with title and mail address, the department of investigation, place and date of birth, education and degrees received, positions held including temporary and minor positions, honorary degrees and other scientific honors, membership in scientific and learned societies, and chief subjects of research. This is followed by a list of American men of science who died between Jan. 1, 1903, and Jan. 1, 1920, giving field of research and dates of birth and death. Finally appears a reprint of CATTELL, J. McKEEN. *Families of American men of science.* Popular Sci. Monthly 86: 505-515. 1915; Sci. Monthly 4: 248-262. 1917; 5: 368-377. 1917, containing much interesting statistical information.—*C. W. Dodge.*

2216. CHAPMAN, A. CHASTON. *The proposed institute of micro-biology.* Nature 108: 425-427. 1921.—The object of such an institute would be to provide for original research with any industry in which micro-organisms or enzymes play an important part; to train workers for such fields; to provide pure cultures for commercial purposes; to serve as a central biochemical library and source of information. The writer thinks it important that this be a separate institute and that this work could be accomplished better by such means than is now done by scattered institutions.—*O. A. Stevens.*

2217. CLAPP, EARLE H., CLYDE LEAVITT, WALTER MULFORD, J. W. TOUMEX, and E. A. ZIEGLER. *North American forest research. Investigative projects in forestry and allied subjects conducted by national, state, and provincial governments, schools of forestry, scientific schools, and private interests in Canada, Newfoundland, and the United States for 1919-1920.* Bull. Nation. Res. Council [U. S. A.] 1: 155-300. 1920.

2218. COBB, RUTH. *Periodical bibliographies and abstracts for the scientific and technological journals of the world.* Bull. Nation. Res. Council [U. S. A.] 1: 131-154. 1920.

2219. CUNDALL, FRANK. *Dr. Anthony Robinson, of Jamaica.* Jour. Botany 60: 49-52. 1922.—These are notes regarding the life and the botanical work of Dr. Anthony Robinson, who died in Jamaica in 1768. [See also Bot. Absts. 11, Entry 2223.]—*Adele Lewis Grant.*

2220. D., W. E. *Earl Jerome Grimes.* William and Mary Lit. Mag. 29: 411-412. 1922.

2221. DAVIS, DONALD W. *Earl Jerome Grimes.* William and Mary Lit. Mag. 29: 314-326. 1922.

2222. DUFOUR, L. *Notice sur Émile Boudier, Président d'honneur de la Société Mycologique de France.* [Note concerning Emile Boudier, honorary president of the Mycological Society of France.] Rev. Gén. Bot. 33: 673-683. Portrait. 1921.—This note of appreciation of the life and work of Emile Boudier includes a discussion of his influence on botany and mycology, and his relations with his students and colleagues.—*J. C. Gilman.*

2223. FAWCETT, W. Dr. Anthony Robinson, of Jamaica. *Jour. Botany* 60: 52. 1922.—The author gives some additional information as to the botanical work and the drawings made by Dr. Robinson. [See also Bot. Absts. 11, Entry 2219.]—*Adele Lewis Grant*.

2224. FULMEK, LEOPOLD, und A. STIFT. Über im Jahre 1920 erschienene bemerkenswerte Mitteilungen auf dem Gebiete der tierischen und pflanzlichen Feinde der Kartoffelpflanze. [Review of the most important contributions published in 1920 relating to the plant and animal parasites of the potato plant.] *Centralbl. Bakt.* II Abt. 54: 492-529. 1921.

2225. GEROULD, JOHN H. The dawn of the cell theory. *Sci. Monthly* 14: 268-277. 1922.—Quotations from Mirbel and Lamarck definitely establish the fact that they stated the cell theory in 1808 and 1809, 30 years before Schleiden and Schwann.—*L. Pace*.

2226. GRAVES, H. S. Dr. Sargent's contribution to forestry in America. *Amer. Forestry* 27: 684-687. *Portrait*. 1921.

2227. HUCKER, G. J. The bacteriological aspects of cheese ripening. *Absts. Bact.* 5: 287-303. 1921.—This bibliographical review cites 242 titles, and includes a topical index of the bibliography.—*D. Reddick*.

2228. [HUSNOT, T.] L'abbé Auguste Friren. *Rev. Bryologique* 48: 47, 48. 1921.—A short account of the life and botanical activities of Abbé Auguste Friren, for many years connected with the diocesan administration at Metz, is here given. He was born at Thionville in 1837 and died at Metz in 1916. Although interested in the vascular plants he specialized in the bryophytes. His most important publications relate to the bryophytic flora of Lorraine.—*A. W. Evans*.

2229. [HUSNOT, T.] L'abbé Faurie. *Rev. Bryologique* 48: 48. 1921.—The death of Abbé Urbain Faurie, for many years a missionary in Japan, is here announced, although neither the date nor place is indicated. He was an ardent collector of plants in Japan and neighboring countries, giving attention to both phanerogams and cryptogams.—*A. W. Evans*.

2230. HUSNOT, T. L'abbé Hy. *Rev. Bryologique* 48: 46. 1921.—The author reports the death of Abbé [Félix-Charles] Hy in 1918 at Angers, where he had served for many years as professor of botany. He was born at Mouliherne in the department of Maine-et-Loire, but the date of his birth is not given. He published a few articles on bryophytes and also numerous papers on lichens, fungi, Characeae, and phanerogams.—*A. W. Evans*.

2231. [HUSNOT, T.] Robert Braithwaite. *Rev. Bryologique* 48: 48. 1921.—A short note records the death of the British bryologist, Robert Braithwaite, in 1917, at the advanced age of 93 years. The British Moss-Flora is mentioned as his principal work.—*A. W. Evans*.

2232. JACKSON, B. DAYDON. Thomas Nuttall (1786-1859). *Jour. Botany* 60: 57. 1922.—Extracts are given from a letter from Mr. F. R. Dixon-Nuttall regarding the burial place of Thomas Nuttall.—*Adele Lewis Grant*.

2233. J[ATUL, P. A.] Ižanga. [Preface.] *Želmeni ja* 1: 2. 1921.—This is a brief autobiographical note indicating the author's previous botanical ventures and the reasons which led him to undertake the present journal, *Želmeni ja*, with the help of M. J. Shileikis, an artist.—*C. W. Dodge*.

2234. J[ATUL], P. A. *Zelmeni ja*. [Botany.] *Želmeni ja* 1: 18. 1921.—Announcement is made of a new Lithuanian quarterly publication, *Želmeni ja*, to be devoted to general botany. It is published by P. A. Jatul, P. O. box 2128, Boston, Massachusetts.—*J. R. Schramm*.

2235. KEITH, M. HELEN. A bibliography of investigations bearing on the composition and nutritive value of corn and corn products. 178 p. Issued in mimeographed form by the National Research Council: Washington, D. C., 1920. \$2.00.

2236. LENDNER, A. Monsieur Emile Burnat. Bull. Soc. Bot. Genève 12: 137-138. 1920.—This is a brief biography of a Swiss naturalist.—W. H. Emig.

2237. MANCHESTER, H. H. A pictorial history of the garden. I. At the dawn of history. Gard. Mag. 34: 237-240. 8 fig. 1922. II. Transplanting trees three thousand years ago—First attempts at founding a botanic garden—The temple gardens of ancient Egypt. Gard. Mag. 34: 311-314. 3 fig. 1922. III. Running an orchard on shares four thousand years ago—Dining outdoors in ancient Assyria—Flowers that grew in the gardens of Asia Minor. Gard. Mag. 35: 113-115. 5 fig. 1922.

2238. MAZZUCHELLI, ING. Egidio Corti. Rev. Bryologique 48: 46, 47. 1921.—The subject of the present note died at Milan in 1921, at the age of 65. Although an architect by profession he was an accomplished botanist, specializing in the bryophytes, lichens, and algae.—A. W. Evans.

2239. MONTESSUS DE BALLORE, R. de. Index generalis 1920-1921. Annuaire général des universités. [General index 1920-1921. General university year-book.] 1800 p. Gauthier-Villars et Cie: Paris, 1921. 50 fr.

2240. NORTON, J. B. S. What America has done for the dahlia. I. Early days and pioneers. Gard. Mag. 34: 192-194. Fig. 7. 1921.—The author discusses the history of the dahlia in America and mentions persons who have been prominent in the development of this flower.—H. C. Thompson.

2241. OBERLY, EUNICE R., and JESSIE M. ALLEN. A check list of the publications on the subject of plant pathology issued by the state agricultural experiment stations 1878-1920. U. S. Dept. Agric. Library Bibliogr. Contrib. 2: 179 p. 1922.

2242. RECORD, SAMUEL J. Bibliography of the woods of the world (exclusive of the temperate region of North America) with emphasis on tropical woods. Mimeograph edition, 28 p. New Haven, Connecticut. 1922.

2243. ROGERS, L. A. Preliminary statement of a project for a laboratory for research in abstract bacteriology. [Abstract.] Absts. Bact. 5: 1-2. 1921.

2244. SCHONLAND, S. W. Tyson F. L. S. Ann. Bolus Herb. 3: 120-121. 1 pl. 1921.—This is a short sketch of the life of W. Tyson (1851-1920), who was one of the most indefatigable of recent botanical collectors in South Africa.—E. M. Doidge.

2245. SHEAR, C. L., and NEIL E. STEVENS. The correspondence of Schweinitz and Torrey. Mem. Torrey Bot. Club 16: 119-289. Pl. 6-7, fig. 1-3. 1921.—Comparatively few of the letters written between Dec. 29, 1819, and Nov. 2, 1833, are missing, 71 being printed here. Long lists of specimens and desiderata are omitted. Of contemporary articles and longer works 94 are mentioned, the complete citations of which form an appendix compiled by FLORENCE P. SMITH. Besides many casual references to plants, members of the following genera are discussed more fully, either as to synonymy or morphology: *Craterium*, *Gyropodium*, *Isaria*, *Phallus*, *Rhizomorpha*, *Sclerotium*, *Thelephora*; *Borreria*, *Cenomyce*, *Evernia*, *Pyrenula*, *Thelotrema*; *Blasia*, *Blandowia*, *Jungermannia*; *Andraea*, *Anoetangium*, *Gymnostomium*, *Grimmia*, *Hypnum*, *Leskea*, *Leucodon*, *Orthotrichum*, *Schistidium*, *Splachnum*; *Woodsia*; *Andropogon*, *Bromus*, *Callitriche*, *Campanula*, *Carex*, *Ceanothus*, *Cerastium*, *Circaea*, *Convolvulus*, *Cyperus*, *Galium*, *Gerardia*, *Gratiola*, *Heuchera*, *Houstonia*, *Impatiens*, *Iris*, *Lithospermum*.

mun, *Lycopus*, *Lysimachia*, *Lythrum*, *Neottia*, *Oxalis*, *Pleuraphis Jamesii* with figure, *Potamogeton*, *Scirpus*, *Sesbania*, *Seymeria*, *Trigonella*, *Veronica*, *Viola*, *Xyris*. Some biographical material is given regarding many contemporary botanists [see Bot. Absts. 11, Entry 2210].—*C. W. Dodge*.

2246. STIFT, A. Über im Jahre 1920 veröffentlichte bemerkenswerte Arbeiten und Mitteilungen auf dem Gebiete der tierischen und pflanzlichen Feinde der Zuckerrübe. [The most important contributions in the field of animal and plant parasites of the sugar beet.] *Centralbl. Bakt. II Abt.* 54: 261-272. 1921.

2247. TUCKER, ETHELYN M. Bibliographical notes. *Jour. Arnold Arboretum* 2: 236-239. 1921 [1922].—The dates of publication of the 20 parts of Hempel und Wilhelm, *Bäume und Sträucher des Waldes*, 1889-1899, and of the 30 fascicles of Siebold, P. F. von, *Flora Japonica*, 1835-1870, are given.—*Alfred Rehder*.

2248. TUTTLE, P. V. Notes on ancient medicine. *Western Druggist* 43: 12, 20-24. 1921.—A brief survey of the early history of medicine and surgery, and some interesting notes regarding the identity of drugs used by the ancients, comprise this article.—*C. M. Sterling*.

2249. W., G. H. Virgil's botany. [Rev. of: SARGEANT, JOHN. *The trees, shrubs and plants of Virgil*. vii + 149 p. B. H. Blackwell: Oxford, 1920.] *Nature* 106: 825-826. 1921.

2250. WATTS, W. W. World list of scientific publications. *Nature* 108: 531. 1921.—This is a proposal to publish an octavo volume to furnish: (1) as complete a list as possible, (2) names of libraries having the publications on file, (3) basis for cooperation between libraries, and (4) library catalog, the compilation to be undertaken by the staff of the British Museum. Price 2£. 2s.—*O. A. Stevens*.

2251. WEATHERBY, C. A. Barratt, Torrey and Schweinitz: a correction and a discrepancy. *Rhodora* 23: 300-301. 1921.—These are notes supplementary to the author's *Old-time Connecticut Botanists and Their Herbaria* [see Bot. Absts. 10, Entry 1586].—*M. L. Fernald*.

2252. WHITE, JAS. W. Cedric Bucknall. *Jour. Botany* 60: 65-67. Portrait. 1922.—This is a short biographical sketch of Cedric Bucknall, who died in December, 1921.—*Adele Lewis Grant*.

BOTANICAL EDUCATION

C. STUART GAGER, *Editor*

ARTHUR H. GRAVES, *Assistant Editor*

(See also in this issue Entries 2332, 2510, 2566, 2994, 2997, 3000)

2253. ANONYMOUS. Science in secondary schools. *Nature* 109: 56-57. 1922.—This is a report of the Science Masters' meeting recently held at the Royal College of Science. Discussions will be reported in *School Science Review*.—*O. A. Stevens*.

2254. ALEXANDER, W. P. A nature-study paradise in western New York. *Nat. Study Rev.* 17: 349-354. 1921.—This is a brief account of a new state park containing much wild mountainous country.—*W. L. Eikenberry*.

2255. FARR, CLIFFORD H. Plant life and human affairs. *School Sci. and Math.* 21: 847-855. 1921.—The author summarizes the important relationships of botany to man's life and indicates the future increasing importance of plant study.—*W. L. Eikenberry*.

2256. GATES, R. R. [Rev. of: GAGER, C. STUART. *Heredity and evolution in plants.* xv + 265 p. P. Blakiston's Son and Co.: Philadelphia, 1920.] *Nature* 106: 723. 1921.

2257. HASTINGS, G. T. A high-school flower show. *Torreya* 21: 101. 1921.—On Sept. 30 and Oct. 1 and 2, 1921, the high schools of New York City held a flower show at the American Museum of Natural History, in charge of the Biology Teachers' Association. It is considered to have been of sufficient value to warrant making it an annual event.—*J. C. Nelson.*

2258. HOLMQUIST, A. M. The biological sciences in Minnesota high schools. *School Sci. and Math.* 22: 166-174. 1922.—This survey of the present situation includes data and a defense of biological study.—*W. L. Eikenberry.*

2259. HUNTER, G. W. An experiment in the use of three different methods of teaching in the classroom. *School Sci. and Math.* 21: 875-890. 1921; 22: 20-32. 1922.—The 3 methods concerned are the textbook method, the lecture method, and the developmental method. The results were favorable to the developmental method, though the author thinks the experiments were not extensive enough to justify a rigid conclusion.—This is an example of the attempt to use biological methods in elucidating the problems of biology teaching.—*W. L. Eikenberry.*

2260. KARSTEN, G. *Asiatische Epiphyten.* In KARSTEN, G., und H. SCHENCK. *Vegetationsbilder.* 14 Reihe, Heft 1. Gustav Fischer: Jena, 1921. 30 marks.

2261. SMALL, J. A textbook of botany. 8vo., 692 p. J. & A. Churchill: London, 1921. 25 s.

CYTOLOGY

G. M. SMITH, *Editor*

(See also in this issue Entries 2456, 2477, 2478, 2479, 2480, 2482, 2483, 2744, 3018, 3091, 3101)

2262. BELLING, JOHN. The behavior of homologous chromosomes in a triploid *Canna*. *Proc. Nation. Acad. Sci. [U. S. A.]* 7: 197-201. 2 fig. 1921.—The author counted the chromosomes in pollen mother cells of 31 species and clones of *Canna*. Of these forms, 22 clones formed 9 heterotypic bivalents, which separated to form 9 + 9 single chromosomes; 3 clones had the same total number of somatic chromosomes (18), but the reduced numbers from each mother cell were usually unequal; 5 clones showed an irregular heterotypic division, the total number of daughter chromosomes being 24 to 26; and 1 clone regularly showed 9 triads and 27 daughter chromosomes. In the last case, counts tended to show that each triad gave a random distribution of its 2 + 1 daughter chromosomes to the daughter nuclei with about half the pollen grains empty. This form resembled the diploid forms in size of plant and flower, while others with more than 18 chromosomes were larger. A triploid *Datura* also formed triads with random segregation.—*Howard B. Frost.*

2263. CHODAT, R. Le mecanisme de la division cellulaire. *Bull. Soc. Bot. Genève* 12: 130-131. 1920.—This is an announcement of a paper to be published in the following issue of the bulletin.—*W. H. Emig.*

2264. DANGEARD, P. A. La structure de la cellule végétale dans ses rapports avec la théorie du chondriome. [The structure of the vegetable cell in relation to the theory of chondriosomes.] *Cómp. Rend. Acad. Sci. Paris* 173: 120-123. 1921.—This is a brief historical résumé of the study of mitochondria in plants and animals, with a statement of the author's interpretation. It is held that the cytoplasm is not a homogeneous substance made up of bodies more recently called mitochondria, but first referred to by Altmann as granules. Dangeard holds that the mitochondria make up at least 3 different systems: the vacuome, formed by the metachromes and ordinary vacuoles and finally giving rise to anthocyanins and

tannins; the plastidome, consisting of the various plastids and the mitochondria from which they arise; and the spherome, composed of numerous refractive fat-forming bodies called microsomes. It is pointed out that in animals the mitochondria may play quite different roles, such as being related to fibrillar structure and activity.—*C. H. and W. K. Farr.*

2265. DERSHAU, M. VON. Pflanzische Plasmastrukturen und ihre Beziehungen zum Zellkern. [Plant plasma-structures and their relations to the nucleus.] *Flora* 113: 199-212. Pl. 8-9. 1920.—The idea of the participation of nuclear material in cytoplasmic processes has been obscured by the conception of the existence of a firm nuclear membrane and the "Kinoplasmatheorie." An effort was made to determine whether the fibrillar structures of Némec have an intimate connection with the nucleus or whether the kinoplasmic threads described by Lindforss and Å. Åckerman are derivatives of the nucleus.—The nucleus in the living cell is surrounded by a clear refractive area into which extend conical projections from the nucleus. Both this area and the projections are destroyed by the ordinary fixing fluids, but preserved by fixing in 70 per cent alcohol. Similar processes were found on the nucleole. At the apex of the projections from the nucleus is found a basichromatic droplet. From such projections beaded threads, extending to the plasma membrane, connect, by plasmodesmen, with similar threads from neighboring cells. These threads at times traverse the nucleus, uniting with it by means of the nuclear processes. The fibrillae consist of a plasmatic ground-substance with nuclein more or less sheathing it. They may serve as a line of conveyance for nutritive substances; this does not preclude an irritable function also. The author confirms earlier investigators in demonstrating the interconnection of nucleus, chloroplast, and pyrenoid in the Chlorophyceae.—The epidermis of a leaf was examined in a cold room, where the nuclear projections were recognized. When transferred to a warm room the process, after about 1 minute, became a thin plasma thread which traversed a vacuole and joined with the plasma membrane. The basichromatic end-droplets of the processes gradually disappear with the building up of the fibrillae, to whose formation they may contribute. The character of the nucleus with distinct processes was observed also in the early and late mitotic phases. The kinoplasmic felt-work which gives rise to the multipolar spindle is, because of these processes, to be considered as of nuclear or even nucleolar origin. The fibers connecting the telophase nuclei have the same relation to the nucleus. Plants especially studied for the observation of these phenomena were: *Pisum sativum*, *Vicia faba*, *Iris germanica*, *Allium cepa*, *Fritillaria imperialis*, *Lilium martagon*, *Tulipa Gesneriana*, *Zea mays*, *Anemone nemerosa*, and *Tradescantia virginica*.—*Wm. Randolph Taylor.*

2266. GILLIS, J. Over Zetmeel en Zijn optische eigenschappen. [Concerning starch and its optical properties.] *Naturwetenschapp. Tijdschr.* 3: 126-131. 1921.—The author, discussing the optical properties of the starch grain, shows that the notion of a hilum at either end of an optical axis as held by Reehlyer [see Bot. Absts. 11, Entry 2278] is untenable.—*C. D. La Rue.*

2267. GOODSPEED, T. H., and M. P. CRANE. Chromosome number in the Sequoias. *Bot. Gaz.* 69: 348-349. 1920.—This is a note questioning Lawson's statement that there are 16 chromosomes in the gametophyte and 32 in the sporophyte of *Sequoia sempervirens*. The authors find the numbers in *S. gigantea* to be respectively 12 and 24, and they think that the same numbers probably obtain for *S. sempervirens*.—*H. C. Cowles.*

2268. GUILLIERMOND, A. Observations cytologiques sur le bourgeon d'*Elodea canadensis*. [Cytological observations on the bud of *Elodea canadensis*.] *Compt. Rend. Acad. Sci. Paris* 173: 331-333. 1921.—The vegetative growing point and the young leaves appear lacking in chlorophyll. In the living condition, small lipid grains corresponding to the spherome of Dangeard may be seen. In development of the leaf chondriocents are transformed into chloroplasts of the plastidome. In addition there are mitochondria not related to plastid formation, and also an extensive vacuolar system.—*C. H. Farr.*

2269. KEILIN, D. On the occurrence of a supplementary chromatic body in *Maupasella nova Céptède* (Ciliata astoma), an intestinal parasite of earth-worms (*Allolobophora caliginosa*

Savigny). *Parasitology* 12: 92-94. *Pl. 6*. 1920.—In many specimens of *Maupasella nova* obtained from the alimentary canal of *Allolobophora caliginosa* Sav., collected near Paris, the author found a ribbon-like supplementary chromatic body. Although present in abundance the author was unable to trace the origin of the chromatic body. Several possible explanations are discussed. This supplementary chromatic body has not been described in other ciliates. The most peculiar thing about it is that those found in different specimens of *Maupasella* are apparently not related to one another, but are formed independently in each ciliate which possesses them.—C. D. Sherbakoff.

2270. KOZŁOWSKI, ANTOINE. Sur l'origine des oleuleucites chez les hepaticues à feuilles. [On the origin of elaioplasts in the leafy liverworts.] *Compt. Rend. Acad. Sci. Paris* 173: 497-499. *Fig. 1-6*. 1921.—It has been shown that chloroplasts, chromoplasts, and leucoplasts are formed by the agglomeration of small droplets of suspended particles in the cytoplasm. The author shows that the oil plastids in the leaves of liverworts (*Lophocolea heterophylla*, *L. bidentata*, *Lepidozia reptans*, and *Mastigobryum trilobatum*) are formed in the same way. From 3 to 28 elaioplasts are found in each cell. They are formed near the chloroplasts and frequently approach the latter in size. It is believed that the substance of which the elaioplasts are composed is formed in the chloroplasts.—C. H. Farr.

2271. LITARDIÈRE, R. DE. Recherches sur l'élément chromosomique dans la caryocinèse somatique des Filicinales. [Researches on the chromosome in somatic mitosis in Filicineae.] *La Cellule* 31: 255-473. *Pl. 1-9, 2 fig.* 1921.—In this detailed study of the behavior of the chromosomes in somatic mitosis in more than 60 species, representing all but 1 of the families of Filicineae, the author finds that the telophasic transformation of the chromosomes (catachromasis) occurs in 4 general modes, each being accompanied by a corresponding mode of prophase transformation (anachromasis). These modes, which are not sharply distinct types and are in no way correlated with taxonomic position, are as follows: (1) Chromosomes large. In telophase the chromosomes become alveolized and connected by anastomoses to form the interphasic reticulum. In prophase the reticulum breaks up into its constituent alveolar-reticulate chromosomes; in each of them the more delicate parts break down, leaving a simple zigzag thread in which, after equalization, the longitudinal split develops. The double chromosomes then shorten and thicken. This mode is found in most Hymenophyllaceae and in *Osmunda*. (2) Chromosomes slender. In telophase there is no alveolation, the chromosomes being drawn out to filaments connected by anastomoses and forming a reticulum often resembling that in mode 1. In prophase the anastomoses are retracted and the chromosomes concentrate directly into slender crooked threads which split and then thicken. *Pteris cretica* and a large number of other species from various families conform to this type. (3) Chromosomes fairly slender. Behavior intermediate between modes 1 and 2. In telophase some chromosomes show narrow alveoles, while others remain unalveolized as simple filaments. All are connected by anastomoses to form the reticulum. In prophase each chromosome becomes an irregular simple thread, the alveolized ones indirectly as in mode 1 and the unalveolized ones directly as in mode 2. The split develops in the simple threads, but it may be obscured in the thick threads of the later prophase and not reappear until metaphase. This mode is found in *Blechnum occidentale*, *Trichomanes*, *Marattia*, and other forms. (4) Chromosomes very small, appearing as round or ovoid bodies, undergoing no transformation other than anastomosis during telophase, and remaining clearly visible in interphase. In prophase the anastomoses disappear; the chromosomes then elongate slightly, split, and again shorten. This mode is observed in *Azolla* and *Salvinia*.—The author gives a list of chromosome numbers reported by others for Filicineae, and also a list of the approximate diploid numbers in 35 species or varieties determined by himself. Most of the numbers are very high, making exact counts difficult or impossible. The facts do not yet warrant any general statement regarding the bearing of chromosome number on phylogenetic relationships within the Filicineae, but it is evident that chromosome number must be considered in separating species and varieties. *Salvinia natans* apparently has 3 races, with 8, 16, and 48 chromosomes. In many if not all fern species the chromosomes of the complement differ in length, but all members of the comple-

ment cannot be accurately measured. Although the thickness of the chromosome may vary considerably in different races and species and only slightly at a given stage in a given race, differences in thickness are not significant as regards broader phylogenetic relationships. Nothing which can be safely interpreted as somatic chromosome pairing is observed in the species studied.—In an extensive comparison of his results with those of other cytologists the author emphasizes the following points. The chromosomes maintain their individuality through all stages of the nuclear cycle: examination of both living and fixed material shows that they have a definitely organized reticulate structure in interphase and that adequate fixation (Benda) does not create this structure but only renders it more visible by modifying refringency. The reticulum consists not of 2 morphologically distinct elements, but of an achromatic substratum impregnated by a more fluid chromatic substance. The telophasic alveolation does not represent a splitting, since each alveolized chromosome gives rise in prophase to a simple thread which splits: splitting in somatic mitosis is prohasic no matter what mode of catachromasis occurs, and the lengthening at this stage is related to the equational character of the division. Splitting does not involve a division of autonomous chromomeres; in fact no evidence of the existence of such units is found in ferns. Alveolation is not due to an imbibition of karyolymph, but to an internal redistribution of the chromosome substance. It is not to be interpreted as a resolution of the chromosomes into granules: "granules" are only the thicker parts of a continuous reticulum. Nor does it represent a "spiralization" of the chromosome, though fragments of spirals often occur as the result of the arrangement of the alveoles. Bolles Lee's theory of the structure and transverse division of chromosomes is rejected. There is no continuous spireme at either prophase or telophase.—The karyolymph does not arise from the chromosomic alveoles, but probably from the karyolymph of the mother nucleus; it occupies the spindle region during anaphase and moves in between the chromosomes after the "tassement polaire" stage, new fluid later being added by the cytoplasm. The nuclear membrane, which becomes very resistant, arises primarily as a condensation of the cytoplasm. The nucleolus has a genetic relation of some sort with the chromosomes, probably arising from a substance which is derived from the chromosomes in telophase and largely transferred to them in late prophase. In nuclei of the small chromosome type there is an inverse relation between the chromaticity of the reticulum and the volume of the nucleolar mass.—*L. W. Sharp.*

2272. NORDENSKIÖLD, E. *Spermatogenesis in Ixodes ricinus* Linn. *Parasitology* 12: 159–166. *Pl. 11.* 1920.—The author states that it has long been known that ticks possess spermatozoa differing considerably from the typical flagellate form. He makes several corrections in his previous communications on the subject. The earlier results were obtained chiefly from material fixed in Carnoy's alcohol-chloroform-acetic acid mixture, while those described in the present paper were obtained mainly from material fixed in Flemming's chromic-osmic-acetic acid mixture. The paper consists mainly of descriptions of the changes in the spermatid during its development.—*C. V. Sherbakoff.*

2273. POLITIS, JEAN. *Du rôle du chondriome dans la défense des organismes végétaux contre l'invasion du parasitisme.* [The role of the chondriosome in the defense of plants against invasion by parasites.] *Compt. Rend. Acad. Sci. Paris* 173: 421–423. 1921.—In a study of the effect of *Oidium Evonymi-japonici* on the leaves of *Evonymus*, it is found that parasitic stimulation produces a reaction in the mitochondria. These mitochondria are the centers of elaboration of such substances as chlorophyll, anthocyan, and tannins. The last named are formed in large quantities under parasitic conditions and probably have a defensive function against the parasite. The reaction of mitochondria in different plants and in the same plant depends upon the degree of development and the nature of the parasite.—*W. K. Farr.*

2274. POLITIS, JEAN. *Du rôle du chondriome dans la formation des essences dans les plantes.* [On the role of the chondriome in the formation of the volatile substances of plants.] *Compt. Rend. Acad. Sci. Paris* 173: 98–100. 1921.—Numerous elongated chondriocones were

found in developing cells of the glandular trichomes of *Pelargonium odoratissimum* and certain of the Labiates, such as *Mentha piperita*, *M. pulgoides*, *Rosmarinus officinalis*, *Thymus vulgaris*. Their presence is correlated with that of tannin compounds.—C. H. Farr.

2275. POTTIER, JACQUES. Observations sur les masses chromatiques du cytoplasme de l'oosphère chez *Mnium undulatum* Weis et *Mnium punctatum* Hedwig. [Observations on the masses of chromatin in the cytoplasm of the oosphere of *Mnium undulatum* and *M. punctatum*.] Compt. Rend. Acad. Sci. Paris 173: 445-448. Fig. 1-15, a-f. 1921.—Masses of extruded chromatin, 1-4 in number, were observed in the cytoplasm of the oospheres of the 2 species. The chromatic masses in both species are often surrounded by a clear zone.—W. K. Farr.

2276. POTTIER, JACQUES. Observations sur les masses chromatiques des noyaux et du cytoplasme des cellules du canal et de la paroi du col de archégone chez *Mnium undulatum* Weis. [Observations on chromatic masses of the nucleus and cytoplasm of the canal cells and neck wall cells of the archegonium of *Mnium undulatum*.] Compt. Rend. Acad. Sci. Paris 173: 463-466. Fig. A-R. 1921.—A study of the material used to show the extrusion of chromatin by the nuclei of the oospheres in *Mnium undulatum* reveals the presence of extruded chromatin in neck canal cells. The peripheral cells of the neck have masses of chromatin which, although bi-lobed and tri-lobed, are rarely completely divided. The extrusion of these latter masses is doubtful.—W. K. Farr.

2277. PRATJE, A. Die Chemie des Zellkernes. [The chemistry of the nucleus.] 29 p. Breslau, 1920.

2278. REYCHLER, A. Over aardappelzetmeel. [Concerning potato starch.] Naturwettenschapp. Tijdschr. 2^o: 9-12. 1920.—In this discussion of the structure of the grain of potato starch, the author states that there is a hilum on either side, one at each end of an optical axis. [See also Bot. Absts. 11, Entry 2266.]-C. D. La Rue.

2279. SPEK, J. Experimentelle Beiträge zur Kolloidchemie der Zellteilung. [Experimental studies on the colloid chemistry of cell division.] 91 p. Heidelberg, 1920.

2280. WISSELINGH, C. VAN. Zehnter Beitrag zur Kenntnis der Karyokinese. [Tenth contribution to the knowledge of karyokinesis.] Beih. Bot. Centralbl. Abt. 1. 38: 273-354. 103 fig. 1921.—The paper is organized under 3 heads: (1) new investigations of karyokinesis in *Spirogyra*; (2) methods for the investigation of nuclei and nuclear figures; (3) the present state of our knowledge of the nucleus and nuclear division in *Spirogyra*.—*Spirogyra condensata* (Vauch.) Kütz and *S. dubia* Kütz, 2 slender species, were used. Earlier papers were based on thicker (broader) species.—In the resting nucleus the chromatin forms a network with thicker knots connected by fine threads. The nucleole is spherical and probably has a membrane. With a magnification of 2,000, after treatment with chromic acid solution and staining with Bayer's blue (extra greenish), the structure becomes visible, a network with thicker parts and fine threads.—In prophase the nucleole disappears except for 2 small bodies. In the early prophase 2, sometimes several, small bead-like chains appear. Later stages show 2 shorter thicker threads of equal size. In metaphase the spindle develops, the nuclear membrane disappears, the nuclear reticulum forms the equatorial plate of a number of short threads or chromosomes, and only the 2 nucleolar threads remain as entities distinct from the nucleole. These are usually found on the outer edge of the equatorial plate, and are larger and more deeply stained than the chromosomes. The equatorial plate divides into halves. The chromosomes and the nucleolar threads divide lengthwise, as is evident in the anaphase. In the telophase the nuclear threads broaden and develop into a network as in the resting nucleus.—The nucleolar threads show the same evidences of individuality as to the chromosomes. In the 2nd species only 1 long thread develops in the nucleole, which divides into 11 short ones. These split on the equatorial plate and later again form 1 thread.—The study was made on material as follows: (1) living material; (2) stained serial sections; (3) material treated by the

chromic acid method; (4) material treated with chemicals, and material cooled, centrifuged, or anaesthetized, etc. For the chromic acid method the material is fixed in Flemming's solution and investigated while in a water solution of chromic acid, usually 25 per cent, but as strong as 50 per cent is sometimes used. Staining in Bayer's Blue (extra greenish) often brings out structures very distinctly.—A full discussion of the present knowledge of nuclear division in *Spirogyra* is given. The question of chromosomes as heredity bearers is discussed with the conclusion that since protoplasm, nucleus, and chromatophore each develops from its like, all could furnish hereditary characters.—*L. Pace.*

ECOLOGY AND PLANT GEOGRAPHY

H. C. COWLES, *Editor*

GEO. D. FULLER, *Assistant Editor*

(See also in this issue Entries 2078, 2081, 2100, 2117, 2132, 2260, 2340, 2395, 2405, 2409, 2411, 2427, 2464, 2514, 2546, 2594, 2626, 2633, 2635, 2643, 2644, 2645, 2652, 2654, 2658, 2660, 2662, 2663, 2665, 2668, 2669, 2670, 2671, 2673, 2722, 2750, 2987, 3000, 3013, 3019, 3144, 3163, 3170, 3171, 3179, 3190, 3191, 3192, 3194, 3195, 3196, 3198, 3201, 3207, 3214, 3229, 3230, 3231, 3236, 3242, 3258)

GENERAL, FACTORS, MEASUREMENTS

2281. BEWS, J. W. The Mont-aux-Sources National Park. Notes on its vegetation. Jour. Bot. Soc. South Africa 6: 11-13. 1920.

2282. HOWARTH, W. O. Notes on the habitats and the ecological characters of three subvarieties of *Festuca rubra* L. Jour. Ecol. 8: 216-231. 6 fig. 1920.—The critical studies of these grasses include not only taxonomic distinctions but anatomical and ecological examination. Subvariety *grandiflora* is a mesophyte in habitat and in structure, found growing on fertile, humid, well aerated calcareous soils, and has dark green glabrous leaves. Subvariety *tenuifolia* shows xeromorphic structures and is found dominantly (1) in salt marshes, (2) on pebble ridges, (3) on exposed rocks of the sea-coast in scanty soil, and (4) on the calcareous tufa on the cliff face. Its foliage tends to be yellowish green. The 3rd subvariety, *glaucescens*, is allied to the 2nd and resembles it in structure and habitat. It grows in the higher zones of the salt marsh and is more definitely yellow-green in color.—*Geo. D. Fuller.*

2283. OSBON, C. C. Classification and formation of peat and related deposits. Jour. Amer. Peat Soc. 14: 37-44. 1921.—Peat is the partly carbonized organic residuum produced by an arrest of the decomposition of roots, twigs, seeds, shrubs, mosses and other vegetation covered or saturated with water. Muck is soil containing a high percentage of uncarbonized organic matter. A bog is a flat or gently sloping wet area devoid of trees, except in some instances small scattered patches of tamarack or black spruce, and overgrown principally by Sphagnum moss and heath shrubs, or by grasses and sedges. A marsh is an open shallow basin or relatively flat area covered with water, devoid of trees and overgrown by grasses, sedges, cattails, bulrushes, or reeds. The chief difference between bogs and marshes lies in the character of the living vegetation and the quantity of surface water. A swamp is distinguished from both by being overgrown by trees. There are 2 types of bogs on the basis of topography—the filled basin type and the built-up type.—*G. B. Rigg.*

2284. PILlichODY, A. VON. Von Spät- und Frühfrösten und über Frostlöcher. [Late and early frosts and frostpockets.] Schweiz. Zeitschr. Forstw. 72: 33-40. 2 pl. 1921.—In the higher elevations of Switzerland, at about 1,000 m., frosts occur through May and some in June. July is usually free from frosts. The fall frosts begin in August. Such conditions are unfavorable to tree growth and also limit the region to exceptionally hardy species. Frost pockets occur in unexpected places due to air drainage. Usually they are almost entirely inclosed and are not covered with tree growth. Spruce persists in some places, but its form is stunted and only a few small needles are borne on each twig.—Records of temperature showed

a difference of 5–11°C. in March, 1–9 in May, and 5–8 in June between the frost pocket and adjacent timber, with the colder temperatures in the frost pockets. Other months show similar variations.—*J. V. Hofmann.*

2285. RICHARDSON, W. D. **The ash of dune plants.** *Science* 51: 546–551. 1920.—Physical and chemical analyses of the sand are given, and show that 90–92 per cent is silica. The remaining 8–10 per cent is undecomposed silicate minerals. The sand is composed of clear white, yellow, and red sand quartz grains and a considerable proportion of highly colored and dark particles. From these last named particles dune plants must, in the main, derive their supply of soluble inorganic nutrient substances. The root systems are well equipped to search the sand for mineral food since they are of relatively large dimension, often greatly exceeding in length the height of the plant. Analyses of ash constituents of several typical species are given. Comparisons of the ash are made with that of like plants growing on normal soil. It is found that the dune plants have obtained and concentrated in their tissues the same mineral constituents commonly found in plants growing in good soils, and these have been accumulated in approximately the same relative proportions. From most inadequate and insufficient sources the dune plants have obtained their requirements of elements such as iron, potassium, calcium, phosphorus, and sulphur, which are assumed to function in metabolism. Other elements, such as silicon, chlorine, sodium, and aluminium are also present in dune plants, although, with the exception of silicon, in small proportion.—*A. H. Chivers.*

2286. SALISBURY, E. J. **Soil reaction.** *Jour. Ecol.* 8: 239. 1920.—This is a review of several papers in volumes 8 and 9 of *Soil Science* which seem to show that the soil reaction may have an appreciable effect upon the acidity of plant juices. This may influence the plant directly or indirectly through the agency of mycorrhiza or symbiotic bacteria.—*Geo. D. Fuller.*

2287. SALISBURY, E. J. **The significance of the calcicolous habit.** *Jour. Ecol.* 8: 202–215. 1920.—In a general discussion of calcicoles it is pointed out that this group of plants is composed of species which find a suitable home on calcareous soils without necessarily implying any obligatory association with, or even preference for, such soils apart from that imposed by climate or biotic factors. Such plants at the limits of their ranges tend to show more decided edaphic limits and it is suggested that calcicole species probably belong to 2 classes, of which one is more responsive to physical features usually associated with calcareous soils, while the other is more sensitive to chemical differences. The complexity of the problem is indicated by drawing attention to the comparative freedom of calcareous soils from toxic products of decay, their usually low water-holding capacity, the more abundant development of soil fauna, and the influence of calcium upon the absorption of other elements such as potassium. There is need of much more accurate data regarding distribution and especially with regard to the actual physical and chemical condition of soils classed as calcareous. It is pointed out that the occurrence of calcifuge species on calcareous soils is at times to be explained by the leaching of the surface layers thus providing a non-calcareous substratum for the development of the early (and critical) stages of the silicicole. A rather extensive bibliography is given.—*Geo. D. Fuller.*

2288. SETCHELL, W. A. **The temperature interval in the geographical distribution of marine algae.** *Science* 52: 188–190. 1920.—The activities controlled are undoubtedly all the necessarily vital activities of the organism, but it is fairly certain that those subject to the special control of the limited temperature interval are those more or less connected with reproduction. In general the reproductive activities are carried on at the maxima of the temperatures at which the plant is actively and normally performing any of its vital functions. The initial temperatures are undoubtedly lower, as are also those of most rapid growth and those of most active metabolism. Probably the optima of effective reproduction which makes for persistence in distribution lie within the surprisingly narrow interval of 5°C. The overwhelming majority of the known marine algae are recorded from 1 zone only. The invasion of other zones than the normal is due to the existence in the invaded zone of tem-

peratures of the intensity duration found in the normal zone. Another interval which has to do with the life in any zone is the interval of amplitude of seasonal variation in temperature. The extreme interval is 10°C. in amplitude. Where the seasonal interval is large the species pass the colder portion of the season in a quiescent state; *Ascophyllum nodosum* is cited as an example. The 10, 15, 20 and 25°C. isotherms of the surface waters sharply mark off the life zones from one another, as shown by a careful study in the region of Vineyard Sound. The explanation of the narrowness of the temperature interval which is of such influence in controlling distribution is at present not clear.—A. H. Chivers.

2289. TAYLOR, ARAVILLA MEEK. Occurrence of *Funaria hygrometrica* (L.) Sibth. Bryologist 24: 7-8. 1921.—*Funaria hygrometrica* is a cosmopolitan species which appears to be a pioneer in many ecologic habitats, such as rock crevices, sandy city lots, burnt ground (here often preceded or accompanied by *Marchantia*), and cinder piles. Its abundance and wide distribution seem due to its being equally adapted to acid or basic soils, not especially dependent on moisture, and to its being an annual species of rapid growth which matures abundant spores early in the season.—E. B. Chamberlain.

2290. WHERRY, EDGAR T. The soil reactions of the ferns of woods and swamps. Amer. Fern Jour. 11: 5-16. 1921.—The author gives a table of classification, based on soil reaction, of 35 species of ferns, 5 of which are intensely acid, 5 acid, 18 indifferent, and 7 calcareous. This is followed by a discussion of the features of the individual species.—F. C. Anderson.

2291. WRIGHT, A. H. The vertebrates of the Otter Lake Region, Dorset, Ontario. 1. General account. Canadian Field Nat. 34: 141-142. 1920.—This is one of a series of short papers treating in a general way the plants and animals of the Otter Lake Region. The introduction includes a few ecological observations.—W. H. Emig.

STRUCTURE, BEHAVIOR

2292. BENNETT, A. G. On the occurrence of diatoms on the skin of whales. Proc. Roy. Soc. London B 91: 352-357. Fig. 1-2. 1920.—Blue whales (*Balaenoptera musculus*) and fin whales (*B. physalus*) taken at South Shetlands and South Orkneys show a buff coating due to almost pure cultures of *Cocconeis ceticola* Nels. n. sp. Blue whales with this coating are known as "sulphur-bottoms." The same color is noted on antarctic icebergs. Clean skinned whales are poor in oil and are believed to be new arrivals from warmer waters. It is believed that the skin flora of whales will be of great assistance in tracing migrations. A systematic note on the diatom material, by E. W. Nelson, is appended.—Paul B. Sears.

2293. BEQUAERT, J. On the dispersal by flies of the spores of certain mosses of the family Splachnaceae. Bryologist 24: 1-4. 1921.—The author observed small flies of the genus *Phorbia* visiting the capsules of 2 species of *Tetraplodon* and licking up the moisture, or secretion, from the stomata. The flies appear always to alight at the mouth of the capsule and then crawl downward, thus coming in contact with the masses of sticky spores forced out by the contraction of the hygroscopic capsule. These flies also frequent animal excreta and decaying organic matter upon which substrata the mosses in question always grow. The flies are apparently attracted to the capsules by the strong odor. A résumé of European observations bearing on the subject is given.—E. B. Chamberlain.

2294. BONNIER, GASTON. The production of honey by bees. Sugar 21: 406-409. 1919.—The production of nectar in flowers is discussed.—C. W. Edgerton.

2295. CANNON, W. A., and E. E. FREE. Soil aeration and growth of roots. [Abstract.] Ecology 1: 64. 1920.

2296. CUTTING, E. M. On the pollination mechanism of *Incarvillea Delavayi*, Frank. Ann. Botany 35: 63-72. 3 fig. 1921.—Each of the 4 anthers has 2 stiff, downwardly projecting prongs, 1 for each lobe. Manipulation of these prongs is followed by the opening of the anther lobes and the discharge of pollen. They are so arranged that 1 lobe of each anther discharges some of its pollen as the insect enters the flower and the other lobe is emptied as the insect comes out. The pollen is characterized by the presence of surface slits. The high osmotic pressure of the contents and the approximation of the walls of the slits on drying are regarded as adaptations to prevent too great loss of water.—W. P. Thompson.

2297. DANIEL, LUCIEN. Recherches expérimentales sur les causes de l'émersion des feuilles de nénuphar. [Experimental researches on the causes of the emergence of the leaves of the water-lily.] Compt. Rend. Acad. Sci. Paris 169: 988-990. 1919.—Previous writers have stated that water-lilies growing at a depth of 32-40 cm. produce leaves which float on the surface of the water, but in water shallower than this the leaves emerge. The author, however, has noted water-lilies growing at a depth of 80 cm. with leaves projecting from the water and he attempts to determine the cause of this phenomenon. Plants were grown in containers of wood, glass, and zinc of varying depths and of various diameters. Grown in glass or wooden receptacles having a depth of 50 cm. or less, the leaves did not emerge. It was noted in certain experiments that there appeared to be a relation between the number of leaves and their behavior. When more leaves were present there seemed to be a greater tendency for the leaves to emerge. In the 1st case noted, however (plants growing at a depth of 80 cm.), no such cause existed since there was no crowding of the leaves. It was noted in this case, however, that the water was covered with *Lemna* which had brought on the death of older leaves of water-lily and of *Hydrocharis*. The water was shown to be fetid and to contain marsh gas. Both the water lily and *Hydrocharis* appeared to emerge to secure air. Both *Elodea* and *Fontinalis* appear to respond in a similar fashion when in danger of asphyxiation. The author concludes that the emergence of water-lily leaves in limited space may be due to the competition between them and in other cases to the struggle between the water-lily and surrounding vegetation. Variations in the water level bear no relation to the phenomenon.—V. H. Young.

2298. DAVY DE VIRVILLE, AD. Modification de la forme et la structure d'une mousse, *Hypnum commutatum* Hedw., maintenue en submersion dans l'eau. [The modification of the form and structure of a moss, *Hypnum commutatum*, maintained in submersion under water.] Compt. Rend. Acad. Sci. Paris 172: 168-173. 1921.—A comparison is made of the length and breadth of the leaves and of the size of the cells of plants growing under water and in the air. It is found that the length in each case is less, but that the width of the cells is not especially affected. The stems, however, are 2-3 times as long as those in air.—C. H. Farr.

2299. PHILLIPS, E. P. Adaptations for the dispersal of fruits and seeds. South African Jour. Nat. Hist. 2: 240-252. Pl. 2-3. 1920.—In the regular methods of seed dispersal 4 agencies are employed,—wind, water, animals, contraction of certain tissues of the fruit.—E. M. Doidge.

2300. SCHROEDER, H. Kräuter und Stauden im Wechsel der Jahreszeiten. [Herbs and shrubs with the change of seasons.] Schriften Naturwiss. Ver. Schleswig-Holstein 17: 199-200. 1920.—A synopsis of a lecture on the behavior of plants during the winter is here given. Various compromises are brought out between structural features which secure the greatest possible protection against the cold and those which enable the plant to utilize the period of the year more favorable for growth and other functions.—A. W. Evans.

VEGETATION

2301. BEAUCHAMP, P. DE. Recherches biogéographiques sur la zone des marées à l'île de Ré. [Biogeographical studies on the tidal zone of the island of Ré.] Compt. Rend. Acad. Sci. Paris 171: 1233-1236. 1920.—This consists of a report on the fauna and flora of the zone between high and low tide on this island.—C. H. Farr.

2302. CLUTE, WILLARD N. *Botanizing in the painted desert.* Amer. Bot. 27: 1-8. 1921.—This is a description of an oasis with its 3 types of flora,—the encroaching desert flora, the hydrophytic flora around the springs, seeps, etc., and the flora of the cultivated lands.—*S. P. Nichols.*

2303. FORBES, H. *An account of the flora of the Malvern District.* South African Jour. Nat. Hist. 2: 195-208. 1920.—This district consists chiefly of grassland. Aloes seem to thrive well on the cliffs of the Umhlatuzana River. Comparatively few xerophytic plants are to be found in this district.—*E. P. Phillips.*

2304. PEARSALL, W. H. *The aquatic vegetation of the English lakes.* Jour. Ecol. 8: 163-201. 13 fig. 1920.—Detailed studies were made of 12 lakes of the hill country of Cumberland, Westmoreland, and Lancashire. "The distribution of the aquatic plants considered is primarily governed by the nature of the substratum, while the reaction of the substratum to vegetation is controlled by variations in the quality and quantity of sediments deposited on it by the type and quantity of organic matter it contains. Light intensity may limit the depth to which types of vegetation descend, but is of secondary importance as a factor in the distribution of most of the plants considered. Temperature conditions are assumed to retard the development of vegetation during early summer, but in other respects to be of little significance. The absence of free floating vegetation is attributed to the paucity of the waters in essential plant food substances. Plant succession is accompanied by changes in the substratum akin to those resulting in the formation of moor peat."—*Geo. D. Fuller.*

2305. POLE EVANS, I. B. *The veld, its resources and dangers.* South African Jour. Sci. 17: 1-34. Pl. 1-28, 1 map. 1920.—This is the presidential address delivered to the South African Association for the Advancement of Science in July, 1920. The author divides South Africa into 19 botanical regions, the main types of vegetation being intimately associated with the physical features of the country. These regions are: (1) the Coast Veld, a region of drowned valleys and sandy dunes covered with dense impenetrable bush, tall grasses and palms, and in which isolated evergreen forests are frequent; (2) the Low Veld, a region of low relief, of wide open river valleys with perennial streams and deep alluvial soils, which are covered with gigantic thorn and other deciduous trees beneath which a rank growth of grass persists; (3) the Eastern Grass Veld including the southeastern region, the great Escarpment and the Basuto Highlands; (4) the Bushveld; (5) the Middle or Banken Veld, a region of gently sloping hills from which escarpments of harder rock project, the hill slopes being covered with grass and the rocky hills with stunted deciduous trees and sclerophyllous bush; (6) the High Veld; a region of vast rolling table lands covered with a dense grassy turf and devoid of trees; (7) the Pietersburg High Veld; (8) the Waterberg Sand Veld; (9) the Griqualand West Thorn Veld; (10) the Kaap Plateau Bush Veld; (11) the Vaal Kameeldoorn Veld of the Asbestos Mountains; (12) the Kalahari Sand Veld; (13) the Damaraland Thorn Veld; (14) the Kameeldoorn Veld of South Damaraland; (15) the South Western Veld; (16) the Karroo; (17) the Upper Karroo; (18) the Kokerboom Veld of Namaqualand and Bushmanland; and (19) the Namib or Western Littoral Belt. The principal physical features of each region are described and an account is given of the vegetation of each, with special reference to its economic aspects. The paper is illustrated by an exceptionally fine series of 56 photographs.—*E. M. Doidge.*

2306. WADHAM, S. M. *Changes in the salt marsh and sand dunes of Holme-next-the-sea.* Jour. Ecol. 8: 232-238. 4 fig. 1920.—The article is a report of the changes in vegetation occurring in 6 years. Maps of the distribution of the plant communities in 1914 and in 1920 are presented. In the salt marsh emphasis is placed upon the length of time the water floods the different areas during the tides and this is regarded as the controlling factor for the distribution of associations of *Armeria*, *Statice*, and *Plantago*. Various types of depressions or "pans" are characterized.—*Geo. D. Fuller.*

2307. YOUNGKEN, HEBER W. *Plant associations.* Jour. Amer. Pharm. Assoc. 9: 1052-1055. 1920.—In this brief exposition of plant associations, classified solely on the basis

of their relation to water, those discussed are: hydrophytes, helophytes, or marsh plants, halophytes, xerophytes, mesophytes, and tropophytes, or alternate plants.—*Anton Hogstad, Jr.*

FLORISTICS

2308. ARMITAGE, ELEANORA. Glamorganshire Bryophyta. *Jour. Botany* 59: 49-50. 1921.—A list of bryophytes collected by H. H. Knight, the author, and others in Glamorgan is given.—*K. M. Wiegand.*

2309. BURNHAM, STEWART H., and ROY A. LATHAM. The flora of the town of Southold, Long Island and Gardiner's Island. *Torreya* 21: 1-11. 1921.—A 2nd supplementary list of plants collected since the publication of the original Flora in 1914 is presented, comprising 153 species of thallophytes, 3 of bryophytes, and 5 of pteridophytes. Notes on habitat, station, and determinations are added.—*J. C. Nelson.*

2310. CHAMPIM, H. C., and W. J. LAMBERT. Notes on a visit to the Pindari Glacier, Kumaon. *Indian Forester* 47: 11-21. 1 pl., 1 fig. 1921.—The plants found en route to the glacier are enumerated.—*E. N. Munns.*

2311. COLLINS, J. FRANKLIN. Three plants new to Rhode Island. *Rhodora* 23: 27. 1921.—The author reports 3 plants from Rhode Island with the stations in New England where they have been reported. These do not appear to have been previously listed from the state. They are *Hedeoma hispida* Pursh., *Apocynum medium* Greene, and *Potentilla tridentata* forma *hirsutifolia* Pease.—*James P. Poole.*

2312. GARLAND, L. V. LESTER. Some plants from Jebel Marra, Darfur. *Jour. Botany* 59: 46-48. 1921.—This is a list of 45 plants collected on the mountain Jebel Marra, by Captain H. Lynes, in 1920. Some notes on the region are appended. The flora is a composite of the floras of north temperate, Mediterranean, Abyssinian, Sudanese, and widespread tropical types.—*K. M. Wiegand.*

2313. GORMAN, M. W. The flora of Mount Hood. Oregon Out of Doors [Portland] 1: 64-96. 1920.—This list of the known flowering plants and ferns of Mount Hood, under both common and scientific names, includes notes on altitudinal distribution.—*C. V. Piper.*

2314. JANCHEN, ERWIN. Vorarbeiten zu einer Flora der Umgebung von Skodra in Nord-Albanien. [Contributions to a flora of the vicinity of Skodra in North Albania.] *Österreich. Bot. Zeitschr.* 69: 128-143, 167-187. 1920.—In this list of 770 species of plants collected within 6-7 km. of Scutari by Janchen and another military officer during the period from 1917 to 1919, specific names, synonyms, brief descriptions, and localities are given.—*E. M. Gilbert.*

2315. KIDDER, NATHANIEL T. Additions to the flora of Isle au Haut. *Rhodora* 23: 26. 1921.—*Salix coactilis* Fernald, *Carex norvegica* Willd., and *Triglochin palustris* L. are reported. None of these species has previously been reported from the immediate region.—*James P. Poole.*

2316. MAXWELL, HERBERT. *Spiranthes autumnalis*. *Nature* 106: 409. 1920.—This record from Scotland [*Nature* 106: 79.] is perhaps an error for *Goodyera repens*.—*O. A. Stevens.*

2317. MELVILL, J. COSMO. *Hieracium amplexicaule* L. *Jour. Botany* 59: 48-49. 1921.—This is a note on the occurrence of this species along the Mersey river between Stretford and Sale. It is a rare introduced plant, but has a good claim to a place in the British flora.—*K. M. Wiegand.*

2318. MERRILL, ELMER D. Comments on Cook's theory as to the American origin and prehistoric Polynesian distribution of certain economic plants, especially *Hibiscus tiliaceus*

Linnaeus. *Philippine Jour. Sci.* 17: 377-384. 1920.—The writer is opposed to the theory that this hibiscus was carried by the primitive Polynesians from America across the tropical regions of the Old World and is to be taken into account as an economic plant. He maintains on purely botanical evidence that it is a species of natural pantropic distribution, that it grows in all tropical countries along the seashore, and that it has been disseminated in ages past by ocean currents, the seed being adapted for such dissemination.—*Albert R. Sweetser.*

2319. MOUSLEY, H. The ferns of Hatley, Stanstead County, Quebec, 1920. *Canadian Field-Nat.* 34: 137-140. 1920.—Forty-one species and varieties of ferns representing 3 families were collected within a very small area surrounding Hatley.—*W. H. Emig.*

2320. NELSON, JAMES C. Additions to the flora of Western Oregon during 1920. *Torreyia* 21: 24-28. 1921.—A list is presented of 34 species found growing spontaneously, none of which is mentioned in Piper & Beattie's *Flora of the Northwest Coast*. Of these 29 are plainly introduced. Parish's recent study of the Immigrant Plants of Southern California includes only 290 species, while at least 450 have been reported in Western Oregon. This is due partly to the greater aridity of the California summer. The plants of Western Europe find more favorable conditions in Western Oregon because of the more abundant rainfall.—*J. C. Nelson.*

2321. POTT, R. Addendum to the first check list of the flowering plants and ferns of the Transvaal and Swaziland. *Ann. Transvaal Mus.* 6: 119-135. 1920.—This is an addendum to the 1st check list of the flowering plants and ferns of the Transvaal and Swaziland published May, 1912, and is based chiefly upon records from the Transvaal Museum Herbarium, and upon other published records.—*E. M. Doidge.*

2322. SALMON, C. E. *Carex Pairaei* in Ireland. *Jour. Botany* 59: 76. 1921.—This is an account of the discovery of this plant by Dr. Scully near Dublin in 1919, and its subsequent collection by A. W. Stelfox.—*K. M. Wiegand.*

2323. SCHAFFNER, J. H. Additions to the catalog of Ohio vascular plants for 1920. *Ohio Jour. Sci.* 21: 128-135. 1921.—A list of 93 names is given, including a number of species new to Ohio, and others which extend their range of distribution in the State. Because of its peculiar geographic position, Ohio has an unusual number of species having their limits within its boundaries.—*H. D. Hooker, Jr.*

2324. STANDLEY, PAUL C. Ferns of Glacier National Park, Montana. *Amer. Fern Jour.* 10: 97-110. 1920.—The author discusses briefly the geographic features of the Park and outlines the 4 life zones represented there,—the Transition, Canadian, Hudsonian, and Arctic-Alpine zones. Then follows a list of 39 species of pteridophytes distributed among 15 genera. The abundance and habitat are given for each species.—*F. C. Anderson.*

2325. STANDLEY, PAUL C. Flora of Glacier National Park, Montana. *Contrib. U. S. Nation. Herb.* 22⁵: 235-438. *Pl.* 33-52. 1921.—This paper is intended to be a guide to the flora of Glacier National Park, and will be useful also in the mountainous regions of Idaho and British Columbia. In the introduction a short account is given of the geological features and life zones of the Park, of the local climatic conditions in their effect on plant life, and of previous collections from the region. A bibliography of publications on the botany of the Park is also given, followed by keys to the families. Short diagnoses of the families, and in most cases of the genera, are given. Under each species the local occurrence and the general range are given, followed by brief descriptions of essential features of the plants, and accompanied by notes on the appearance or local uses of the species. The plates give illustrations of the scenery and of a few of the characteristic plants of the Park. The following names are new: *Aquilegia Jonesii* *elatior* Standl., subsp. nov.; *Sophia parviflora* (Lam.) Standl. *Oxytropis spicata* (Hook.) Standl. In this work 955 species are enumerated, nearly all of which were collected by the author in 1919.—*S. F. Blake.*

2326. THOMPSON, H. STUART. *Agrostis nigra* in France: a correction. Jour. Botany 59: 77. 1921.—This plant listed from Var in Jour. Botany 1913, p. 196, proved to be *Poa trivialis*.—K. M. Wiegand.

2327. WATERS, C. E. The ferns of Baltimore and vicinity. Amer. Fern Jour. 11: 19-25. 1921.—The list, comprising about 31 species distributed among 13 genera, is very similar to that for the District of Columbia.—F. C. Anderson.

APPLIED ECOLOGY

2328. SIM, T. R. Causes leading towards progressive evolution of the flora of South Africa. Presidential address to Section C. South African Ass. Adv. of Sci. 1920. South African Jour. Sci. 17: 51-64. 1920.—By maintaining the eastern grass veld unburned, by maintaining the forests or replacing them by exotic species of more rapid growth and of greater transpiration, and by vastly increasing the area under such exotic trees especially in the grass veld slopes and in the natural tree and scrub lands and on the mountains, the amount of saved and redistributed moisture is increased enormously. On the other hand, by continued grass burning, forest destruction, over-stocking veld, bad agriculture, water concentration and donga formation, practically all rain is drained off immediately. There is very little redistributed moisture and that little becomes less year by year. South Africa is still in the stage when the fly-wheel of natural sequence may be started either in the direction of afforestation and grass protection, leading to upward plant succession, accompanied by general vegetative and climatic improvement, or in the direction of veld fires, forest destruction, and down-grade vegetation, reacting on the climate, which again reacts on the vegetation until at last the continent is past redemption and mankind as well as the fauna and flora must perish.—E. M. Doidge.

FOREST BOTANY AND FORESTRY

J. S. ILLICK, *Editor*

(See also in this issue Entries 2095, 2120, 2226, 2284, 2582, 2602, 2639, 2961, 3013, 3179, 3194 3197)

2329. ANONYMOUS. Forsøgsvaesendets Ordning og Ledelse. [Organization and administration of forest research.] Forst. Forsogsv. Danmark 5: 391-420. Pl. 7, fig. 2. 1921.—Organization, administration, headquarters, activities, and experimental fields of the Danish Forest Experiment Station are discussed. Mr. A. Oppermann is the present leader. With him, working along more or less special lines, are 6 permanent members. Their activities, co-ordinated with the Department of Agriculture, are approved by a committee of which the Director is a member. In 1917 appropriations were made for substantial headquarters of 5 buildings and 1 permanent caretaker. The plantations and experimental tracts are in different parts of the country. The 2 nurseries are at Egelund and Møllevangen. Numerous planting tests have been made with native and exotic species. Aside from forestation experiments considerable work has lately been done in biology of forest soils, forest mensuration, utilization, insect enemies of trees, and forest influences.—J. A. Larsen.

2330. ANONYMOUS. Government forest work in Utah. U. S. Dept. Agric. Dept. Circ. 198. 31 p. 1921.—A popular digest.—L. R. Hesler.

2331. ANONYMOUS. Shall the Forest Service be eliminated from Alaska? Amer. Forestry 28: 37. 1922.—Editorial.—C. H. Otis.

2332. ANONYMOUS. The forestry department of Edinburgh University. Nature 106: 706-707. 2 fig. 1921.

2333. ANONYMOUS. *Vers la futaie*. [Tending towards high forest.] Bull. Trimest Soc. Forest. Franche-Comté et Belfort 14: 207. 1921.—Of the numerous communities of Haute-Saone which have agreed to convert their coppice into high forest, 10 are noted, with the areas to be converted. The method is to substitute for the coppice cuttings on a 25 or 30 year rotation improvement cuttings at periods of 12–15 years, with a limit of 30 per cent of volume of the material to be cut. No change in the division of the forest into parcels is contemplated. In the mountainous regions, planting of fir is prescribed immediately after cutting.—*J. Kittredge, Jr.*

2334. ANONYMOUS. [Rev. of: TROSCHEL, ERNST, Editor. *Handbuch der Holzkonservierung*. (Handbook of wood preservation.) xi + 450 p. Julius Springer: Berlin, 1916.] Nature 109: 73. 1922.—This work by 12 authors is highly commended.—*O. A. Stevens.*

2335. AMILON, J. A. *Sveriges Prästskogar*. [Sweden's ecclesiastical forests.] Skogsvårdsför. Tidskr. 19: 144–156. 1921.

2336. ANDERSSON, GUNNAR. *Världens Barrskogstillgångar*. [The world's coniferous forest resources.] Skogsvårdsför. Tidskr. 19: 1–32. Fig. 1–8. 1921.—Forest conditions, production, and consumption are discussed for the principal countries of the world. The conclusion reached is that the future demand for forest products is going to exceed the supply.—*G. A. Pearson.*

2337. ARX, WILH. VON. *Electrische Leitungen durch Waldungen*. [Electric power lines through forests.] Schweiz. Zeitschr. Forstw. 72: 299–304. 1921.—The author calls attention to the dangers of allowing free use of forests for power lines, and advocates charges for power lines and water power sites. Definite plans are outlined. The importance of having power lines in underground cables is emphasized.—*J. V. Hofmann.*

2338. BADOUX, H. *Köhlerei im waadtelandischen Jura*. [Charcoal pitting in Waadt, Jura.] Schweiz. Zeitschr. Forstw. 72: 293–298. 2 pl. 1921.—Charcoal burning is a past industry in Switzerland, although it was quite extensively practiced prior to 1898. In Saint Croix in 1917 a single operator was found, and his supply was consumed locally. The species used in the various localities totaled about as follows: beech 22.7, oak 21.3, willow 20.6, birch 20.9, pine 25 per cent. The 4 pits in operation required 65–110 ster of wood each and burned 8–20 days. Although the price advanced from 8.50 Fr. per kgm. in 1912 to 42. Fr. in 1918, it would not be feasible to reopen the industry in Switzerland.—*J. V. Hofmann.*

2339. BIRCH, J. J. *Mahogany*. Amer. Forestry 27: 710, 727. 1921.

2340. BORNEBUSCH, C. H. *Objective beskrivelse af et Skovdistrikts Urteflora*. [Objective description of herbaceous flora in a forest.] Dansk Skovfor. Tidsskr. 6: 76–91. Pl. 4, fig. 2. 1921.—The author's method of taking stock of the herbaceous flora in a forest is called objective because it will be possible to repeat comparisons by the same or different persons at different times. A map of suitable scale is used in the field for designation of type boundaries; within these types, symbols indicate characteristic species in distribution and abundance. Closer analysis is made according to Raunkiaer's method for the different types of flora. The tables in this report show occurrence and frequency for a particular area in Denmark.—*J. A. Larsen.*

2341. BUSSE. *Der Wald in Zeiten politischer Umwälzungen*. [The forest in times of political revolutions.] Zeitschr. Forst- u. Jagdw. 53: 193–206. 1921.—This address, delivered at the anniversary celebration of the Eberswald forest academy, gives a short account of German forest history with especial reference to the destructive influences of political revolutions, such as those of 1524, 1848, and 1914–18, upon the forest, and summarizes the economic significance of the German forests before the late war. The author outlines the present problems facing the German forester.—*J. Roesser.*

2342. BUSSE. *Mein Reiseeindruck von Bärenthoren*. [My travel impressions of Bärenthoren.] *Zeitschr. Forst- u. Jagdw.* 53: 157-162. 1921.—Von Kalitsch's Bärenthoren management system is based on care and culture of the soil and of the stand. Schwappach has stated that the soil in Bärenthoren is better than it appears to be, even under mismanagement, and natural regeneration of pine is a logical result. The felling scheme or silvicultural system is not orderly, and it is necessary to log through stands of heavy reproduction; von Kalitsch will eventually have to adopt a form of orderly regulation. The entire forest does not present a new form, but gives very much the appearance of a high forest system with natural regeneration, even though preparation felling, reproduction felling, etc., are not recognized. This is due to the extraordinary recuperative powers of clumps of pine reproduction and their habit of forming even-sized stands, although not even-aged, upon removal of the old trees.—*J. Roesser*.

2343. CALVINO, M[ARIO]. *El Aromo Amarillo, planta de tanino*. [The Aromo Amarillo, a tannin-containing plant.] *Rev. Agric. Com. y Trab.* [Cuba] 4: 590. 1921.—*Acacia farnesiana* Willd. grows extensively on poor land in Cuba. Mature pods without the seed contain 23.2 per cent tannin. The fruit is composed of 53 per cent by weight of seed and 47 per cent of pod.—*G. R. Hoerner*.

2344. CALVINO, MARIO. *Los mimbres*. (Genero: *Salix*.) [The willows.] *Rev. Agric. Com. y Trab.* [Cuba] 4: 624. 1921.—The species mentioned are *Salix rubra*, *S. viminalis*, *S. vitellina*, *S. purpurea* and its hybrids, and *S. alba*. A discussion of the uses, propagation, soil requirements, planting, and importance of the crop is given. The cultivation of willows and the promotion of the willow industry in Mexico are discussed.—*G. R. Hoerner*.

2345. CALVINO, M[ARIO]. *Otra planta arbórea de la familia de las leguminosas rica en tanino*. [Another arboreal plant of the legume family rich in tannin.] *Rev. Agric. Com. y Trab.* [Cuba] 4: 590. 1921.—A legume from Mexico, *Huamuchil Pithecolobium dulce* (Roxb.) Benth., growing in the Agronomic Experiment Station grounds in Cuba, produces bark containing 25 per cent tannin. Seeds may be obtained from the station upon request.—*G. R. Hoerner*.

2346. CARLSON, K. A. *Cedrela Toona*, a silvicultural note, with special reference to natural regeneration in the Government plantation, Barberton. *Jour. Dept. Agric. Union South Africa* 3: 231-245. *Pl. 1-5*. 1921.—The optimum conditions for *Cedrela toona* for the Union are as follows: the nearer the climate approaches tropical conditions the better. In the Zoutpansberg Range elevations up to 4,000 feet may be planted, but further south an altitude 3,000 feet or less should be selected. An average rainfall of 30 inches and upwards is needed, sub-soil moisture or a moisture-retentive soil is necessary for a dense stand to survive long spells of drought and proximity to Eucalypts or other moisture-exhausting species is harmful. Rich alluvial soil is best, and skilful silvicultural management is necessary.—*E. M. Doidge*.

2347. CARLSON, K. A. *Timber supplies and industrial progress*. *South African Jour. Indust.* 5: 11-18. 2 fig. 1922.—The need of more extended afforestation in South Africa is emphasized. Figures and statistics from the industrial centres of the world are cited. The author believes that the forests of the world are being depleted more rapidly than they are being replaced, and that no country can hope to attain great industrial prosperity unless largely self-supporting in timber.—*S. M. Stent*.

2348. CARTER, C. F. *Our reforestation activities*. *Sci. Amer.* 125-A (Dec.): 106-107. 5 fig. 1921.

2349. CHEVALIER, AUG. *Situation de la production du caoutchouc en 1921*. [Rubber production in 1921.] *Rev. Bot. Appl.* 1: 33-103. 1921.—In a rather lengthy article the writer

considers: (1) The present condition of the world rubber market and the geographic relationships of the chief rubber-producing plantations; (2) the culture of *Hevea brasiliensis* in French Indo-China and its future in that country; (3) the production of wild rubber in various parts of tropical Africa. He concludes that the production of wild rubber is on the decrease in tropical Africa, and that it is not possible to establish European plantations in Africa capable of competing with those of French Indo-China or Indo-Malaysia, but that it is very necessary that local governments should organize experiment stations for the education and guidance of colonists and natives.—*P. G. Russell.*

2350. CHEVALIER, AUG. [Rev. of: BRIEY JACQUES DE. *Mission Forestière et Agricole au Mayumbe* (Congo belge). Documents mis en ordre et annotés par E. de Wildeman. (The commission of forestry and agriculture at Mayumbe (Belgian Congo). Edited by E. DE WILDEMAN.) Brussels, 1920.] Rev. Bot. Appl. 1: 29-31. 1921.—The book was published after the death of the author. There are 4 principal subjects treated; (1) The forests and timber of Mayumbe, (2) yams, (3) bananas, and (4) the oil palms.—*P. G. Russell.*

2351. CORNEFERT, R. *Régénération sur les hauts plateaux du Jura.* [Regeneration of the high plateaux of the Jura.] Bull. Trimest. Soc. Forest. Franche-Comté et Belfort 14: 206. 1921.—Regeneration of the forests of the Jura becomes difficult at over 1100 m. altitude. Owing to the luxuriant herbaceous vegetation which immediately follows the melting of the snow, the natural reproduction of spruce is crowded out. Artificial regeneration is therefore necessary and nurseries have been established. The fungus *Herpotrichia nigra*, which vegetates under snow, is a serious enemy of the nursery stock of spruce which is pressed to the ground by snow. A process of preventing damage has given excellent results: in the autumn, barked poles 10-15 cm. in diameter are placed between the ranks of plants, so that the plants lean upon them. In the field each plant is similarly placed where it can be supported by a stone or a stump. It is useless to attempt to reforest the pot holes which exist on these high plateaux.—*J. Kittredge, Jr.*

2352. COX, S. *Annual administration report of the forest department of the Madras Presidency for the forest year ending June 30, 1920.* 76 + lxi + 17 p. 1921.—This annual report covers in detail all forest operations. During the year the area of reserved forest increased from 18,712 to 18,794 square miles, and that of reserved land decreased from 682 to 565 square miles. Of 36,700 miles of boundary all but 2,000 miles have been demarcated. Little progress was possible either in the preparation of new or in the revision of old working plans. Some progress was made in construction of new roads and in improving water supply. Trespasses of all kinds continue to increase. Most grazing and cutting trespassers are detected and punished, but fire trespass, the most serious, is not yet adequately met. Severe forest fires occurred, and not less than 1,000 square miles of specially protected forest was burned during the year, including some important plantations. Early burning as a protection against disastrous summer fires was inaugurated in some areas, and is said to have furnished satisfactory protection. The effect of repeated fires on the forests in delaying natural regeneration is noted. The output of timber increased from 98,580 to 105,800 tons, and of fuel wood to 549,700 tons. The minor forest products such as bamboo and tanning bark also show an increase. Grazing revenues were the highest recorded in the past 10 years. Increased artificial propagation of sandalwood is noted. Research work is still inadequately handled. The net revenue for the year was Rs. 24,37,482 as compared to a 10-year average of 14,75,458. The sudden increase was due largely to high prices following the war. A separate report is given for each of the 4 circles in the Presidency, with a summary for the entire Presidency.—*S. B. Show.*

2353. DACY, G. H. *Sherlock Holmes of the forests.* Amer. Forestry 28: 72-75. 10 fig. 1922.—The author gives a graphic description of the activities of organized forest rangers in California and their methods of gathering data and interpreting evidence which will lead to the identification and location of incendiaries.—*Chas. H. Otis*

2354. DENZIN. Altersklassen und Betriebsklassen. [Age classes and working sections.] Zeitschr. Forst- u. Jagdw. 53: 129-143. 1921.—This critical comparison favors the Prussian working plan instructions of March 17, 1912, over the supplemented instructions of March 12, 1919. The old system furnished an inventory of the stand in that it called for a division by age classes and a summary for all the species in mixture. The new instructions avoid this, the scheme of management being governed by the principal species in the mixture. One working-section may contain species of widely separated rotation ages, which contradicts the purpose of establishing a working-section. Further more, the normal removal age of the stand is based on the period of rotation of the principal species with a total disregard of the rotation age of perhaps a greater area of an associated species. The old system provided for an age class division and representation on the ground of each distinct rotation represented in the stand.—J. Roeser.

2355. EBERTS. Die Thüringer Waldwinde. [The Thuringia forest windlass.] Zeitschr. Forst- u. Jagdw. 52: 420-422. Fig. 1-2. 1920.—This is a light hand-apparatus for uprooting trees, consisting mainly of a windlass fastened low down on one tree, and a steel wire rope leading to a hook fastened high up on the tree to be felled. The tree is pulled over by winding the windlass.—A. H. Graves.

2356. ECKBO, NILS B. Industrial timber research abroad and in South Africa. 2. South African Jour. Indust. 4: 737-744. 7 fig. 1921.—The total yield of timber from all the forests of South Africa falls far short of the local demand. At the same time it is evident that sufficient use is not made of the very good timber that the country can produce, and this is largely because the local timber is badly seasoned and quite unreliable. In this article are discussed in detail the general principles and theories of cutting and seasoning and the adaptation of these to the climate of South Africa, and the damage done to wood by fungi and insect pests.—S. M. Stent.

2357. ECKBO, NILS B. Industrial timber research abroad and in South Africa. 3. South African Jour. Indust. 4: 778-787. 4 pl. 1921.—This article gives in detail the best methods of seasoning wood, with special reference to, and description of, the Pretoria kilns.—S. M. Stent.

2358. ECKBO, NILS B. Industrial timber research abroad and in South Africa. 4. South African Jour. Indust. 4: 847-854. 1921.—This article deals entirely with up-to-date methods of seasoning wood as carried out at the Pretoria kilns and directed by the Department of Forests in cooperation with the South African Railways. The most useful and abundant indigenous timbers of South Africa are the yellow woods (*Podocarpus* spp.). The treatment of falcate yellow-wood (*P. falcata*) is described in detail.—S. M. Stent.

2359. ECKBO, NILS B. Industrial timber research abroad and in South Africa. 5. South African Jour. Indust. 4: 896-904. 2 fig. 1921.—In this article the seasoning of the 2 other South African yellow woods—common or Outeniqua yellow wood (*Podocarpus elongata*) and real or upright yellow wood (*P. Thunbergii*)—is described. The severe tests which the seasoned yellow wood has stood is positive proof of the perfection of the treatment. The supreme test is the making of patterns for metal castings, which patterns have remained true after constant use.—S. M. Stent.

2360. ECKBO, NILS B. Industrial timber research abroad and in South Africa. 6. South African Jour. Indust. 5: 57-65. 6 fig. 1922.—The best methods of seasoning the wood of Eucalypts in general and the Karri gum (*Eucalyptus diversicolor*) in particular are given.—S. M. Stent.

2361. ECKBO, NILS B. Industrial timber research abroad and in South Africa. 7. South African Jour. Indust. 5: 116-121. 5 fig. 1922.—The necessity of preserving wood, especially in South Africa, from the destroying agents—fungi, insects, and fire—is discussed.—S. M. Stent.

2362. EDEN, JOHAN. Något om Skogsbokföring ock Skogsstatistik. [Forest book-keeping and forest statistics.] Skogsvårdsför. Tidskr. 19: 51-76. *Fig. 1-8.* 1921.

2363. EICHHORN. Die beste Bestandsform und das beste Einrichtungsverfahren. [The best silvicultural form and the best working plan.] Zeitschr. Forst- u. Jagdw. 53: 38-44. 1921. Möller's recent account of his Bärenthorener continuous management in pine [see Bot. Absts. 9, Entry 186; 11, Entry 2394] and Eberbach's late admonition in "Silva" recall the latter's announcement in 1913 in which he suggested setting aside the governing silvicultural forms and accepting the selection forest as the standard. The author regards Eberbach's general conclusions impracticable. Eberbach also overvalues the inventory of stock for the purpose of establishing the increment; in mixed stands it is doubtful that his system is as reliable as the present yield tables and measurement of sample plots. His "middleforest," suggested as the best unevenaged form for intolerant species, cannot be considered as a silvicultural form of the future. The author is also at a loss to account for Eberbach's disregard of separation of final from intermediate yields, since he places great weight on the care and control of the growing stock. The "natural" silvicultural form of Eberbach and its yield regulations can not serve as a standard for German forest management.—*J. Roesser.*

2364. EKMAN, WILH. Några Skogspolitiska Problem för Norrland. [Forest political problems in Norrland.] Skogsvårdsför. Tidskr. 19: 33-50, 77-101. *Fig. 1-19.* 1921.—Norrland is a large, sparsely settled province in northern Sweden. Timber is one of its greatest resources. The population and the timber business have increased steadily since 1870. The lumber industry has furnished employment in the past; a stable forest policy will assure its permanence. Although destructive logging has been the rule in past years, and private owners are still inclined to sacrifice future for present returns, there are many examples of intensive forestry by private owners. National forest laws now prohibit forest devastation on private as well as public lands. Apparently the enforcement of these laws is dependent in a large measure upon the good will of the owner.—In the more remote sections, the practice of forestry encounters difficulties in shortage of labor, lack of housing facilities, and inadequate transportation. The remedy for the 1st 2 of these conditions lies in agricultural settlement, which is dependent upon the employment and presumably the markets furnished by lumbering and forestry. Emphasis is placed upon the importance of fostering among settlers a favorable sentiment toward forestry, as a means both of creating a source of dependable labor and of encouraging the practice of forestry by farmers. Removal of certain legal restrictions hampering the lumber industry, farmer, and laborer is urged. The article concludes with an appeal for cooperation between the lumber industry, forestry, and agriculture as the only solution for the economic problems of Norrland.—*C. A. Pearson.*

2365. ERDMAN. Künstliche Düngung im Walde. [Artificial manuring in the forest.] Zeitschr. Forst- u. Jagdw. 53: 155-157. 1921.—Experiments in the use of lime and other fertilizers do not substantiate the theory that they have no effect on the better class of soils. Although some tests yielded no evident results, others showed a decided, if not uniform, influence on plant development. For soils of average lime content more data are necessary. Beech can be retained on even the poorest soils by the application of lime. If a degenerated forest soil be properly cultivated by removing the dry peaty surface covering and either sowing broadcast or planting close, beech is able to thrive and grow with astonishingly small amounts of lime in the soil.—*J. Roesser.*

2366. FANKHAUSER, F. VON. Verbauung und Afforstung in den Einzugsgebieten der Wildbäche. [Terracing and afforestation for the control of irregular streams.] Schweiz. Zeitschr. Forstw. 72: 257-260. 1921.—In this reply to Marti [see Bot. Absts. 11, Entry 2389] it is claimed that the cost of terracing is prohibitive, and that it is not as effective as afforestation, especially on steep slopes. The greatest factor in control of the streams is larger forest holdings on the watersheds and complete stocking.—*J. V. Hofmann.*

2367. GESCHWIND, A. Die Technik der Wesselyschen Resurrektionshiebe in den Laubholzkrüppelwaldresten des Karsten. [Wessely's resurrection method of treatment in the stunted hardwoods of the Karst region.] *Centralbl. Gesam. Forstw.* 46: 193-218. 1920.—A considerable part of the Karst region is covered with a sprout forest of mixed hardwoods, which at present is in a stunted and almost devastated condition due to overcutting and excessive grazing. Heavy browsing by stock prevents the shoot growth from developing. Wessely's method of rehabilitating is to allow the root-stocks to develop unhindered and to plant nursery stock in the openings. The rehabilitating areas should be fenced to prevent grazing for several years. The author discusses also the influence upon sprout regeneration of drought, frosts, insects, fungi, and in particular the cold and desiccating bora, which sweeps this region. As root sprouts are stronger than stump sprouts, the stump height should be 3-5 cm. above the point of connection between the trunk and root. The cutting should be done just before the sap flows.—*R. H. Weidman.*

2368. GREELEY, W. B. Fires on the national forests. *Amer. Forestry* 28: 49-51. 1922.

2369. GROSSCUTH. Die Verjüngung der hessischen Kiefernbestände mit Buche und deren Einbringung. [The regeneration of Hessian pine forests with beech and its method of introduction.] *Zeitschr. Forst- u. Jagdw.* 53: 173-178. 1921.—The author discusses the natural regeneration of pine and beech in mixed stands in the forest district Wildeck and the artificial introduction of beech in pine stands and pine in pure beech stands, and outlines rules governing thinning operations in mixed stands.—*J. Roeser.*

2370. GUTHRIE, J. D. Forestry awakening in Washington. *Amer. Forestry* 28: 51. 1922.

2371. HALL, A. F., Editor. *Handbook of Yosemite National Park.* xiii + 347 p., 26 pl., 12 fig. G. P. Putnam's Sons: New York and London, 1921.—The book includes, among others, the following chapters: Trees of Yosemite Park, pp. 219-234, by Hall; The Giant Sequoia, pp. 235-246, by W. L. Jepson; Flowers of the Yosemite, pp. 247-267, Jepson; and a key to cone-bearing trees in the appendix.—*R. S. Harris.*

2372. HASLUND, OVE. Granskogens production og rentabilitet. [Production and rate of interest of spruce forests.] *Tidsskr. Skogbruk* 29: 160-224. Fig. 15. 1921.—This reports growth in diameter, height, and volume of Norway spruce of different diameter classes for trees of different form and for qualities I and II sites. The data are based on 1,971 sample trees representing 4-5 per cent of 65,000 dekar. Trees of low form point show up best in growth of diameter and volume production per individual tree. This is more true for the small than for the larger trees. Those of high form point, which are usually the older, have less crown space, stand close, and produce more volume per acre than the trees of low form point. If the forest loses the better formed trees by careless or unregulated cutting and selection for special material, as has been the case in the past, the forest production and financial yield will decrease. It is shown that trees of higher form point yield better return on the money invested in the forest than others. It is also pointed out that too high returns should not be expected from capital invested in forests; in Norway 3.5-4 per cent is considered fair for large private holdings and 4-4.5 for small private holdings.—*J. A. Larsen.*

2373. HAUCH, L. A. Faren ved Plukhugst i Danske Skove. [The danger from selection cutting in Danish forests.] *Dansk Skovfor. Tidsskr.* 6: 65-75. 1921.—The author regards selection cutting, advocated by F. Muus in a previous article, injurious to the Danish hardwood forests. The fact that selection cutting worked well in Belgium carries no promise of success for it in Denmark; old selection cuttings prove that this method is poor silviculture. The trees become tall and spindly and are easily injured. The dangers to Danish hardwoods described by Muus are said to be imaginary rather than real.—*J. A. Larsen.*

2374. HELMS, JOHS. Proveniensenforsög med Skovfyr. [Planting tests of (Weymouth) varieties, white pine.] Forst. Forsögsv. Danmark 5: 353-371. Pl. 13, fig. 1, 1921.—Tests were begun in 1908 by planting 6 plots of white pine at Feldborg, Denmark. The stock was 2 years old from seed collected from older trees at Feldborg, Frederiksværk, Assebro, Rörvig in Denmark. Scotch and Norwegian stock was also used. Measurements in 1920 showed diversified growth and development. The trees of Norwegian origin grew very slowly and became badly diseased. The Frederiksværk variety also made very slow growth and is badly diseased. The rest grew rapidly, those of Scotch and Assebro origin best. The trees less exposed to the wind were less injured by reddening or killing of needles due to excessive evaporation when the ground is frozen. The lessened vitality of the plants from this cause renders them more liable to attack by *Tortrix buoliana* and *Lophodermium pinastri*. These varieties show also a marked difference in resistance to *Lophodermium* attack, and in the case of the Frederiksværk specimen a weakness in this respect seems inherited from the parent trees.—J. A. Larsen.

2375. HOFFMANN, F. Über die Grundlagen der Rechnungslegung in der Staatsforstverwaltung. [A basis for rendering accounts in state forest administration.] Centralbl. Gesam. Forstw. 46: 225-246. 1920.—The State provides that corporations make regular public statement of their accounts. This has not been done heretofore by the State in its own various business activities, though indications are that this will be necessary. A method is outlined in detail for rendering annual public statement of the finances of the State Forest Administration.—R. H. Weidman.

2376. HOLTEN, JUST. Laerk i Nordøstsjælland. [Larch in northeast Shälland, Denmark.] Tidsskr. Skogbruk 29: 92-148. Pl. 12, map 3. 1921.—The author discusses sites, climatic conditions, mixtures, and silvicultural treatment suitable for larch in Denmark. Both seeding and planting of larch have given good results, but it is not suitable for a general and extensive planting of pure forests in that it prefers slope land to bottomland.—Larch makes good growth and obtains good form in mixture with spruce, noble fir (edel gran), and beech; in mixture with these more tolerant trees it maintains the lead and is able to survive. This quality in larch enables under-planting or culture of tolerant trees which tend to preserve the site and increase the total yield.—J. A. Larsen.

2377. HÖNLINGER, H. Zum Methodenstreit in der forstlichen Statik. [Controversy over methods of forest statics.] Centralbl. Gesam. Forstw. 46: 100-111, 144-151. 1920.—This is chiefly a refutation of Neubauer's conception of the theory of highest interest on capital value of the forest (Reinertragslehre). Forest finance and mathematics of valuation formulae are gone into in detail to prove the author's position.—R. H. Weidman.

2378. HUTCHINSON, W. Forest fires—a national problem. Amer. Forestry 27: 675-683. 11 fig., 1 map. 1921.—From 1916 to 1920, inclusive, the total loss from forest fires in 45 states, including national forests, was more than \$85,000,000. The total number of forest fires in this period was 160,000, and 56,488,000 acres were burned over. Of these fires 80 per cent were caused by man, and were, therefore, preventable.—Chas. H. Otis.

2379. ILLICK, J. S. The American walnuts. Amer. Forestry 27: 699-704. 13 fig., 1 map. 1921.—This is a popular description of the black walnut (*Juglans nigra*) and butternut (*J. cinerea*) of the East, and of the California walnut (*J. californica*) and the southwestern walnut (*J. rupestris*) of the West, with notes on several exotic walnuts.—Chas. H. Otis.

2380. ILLICK, J. S. The maples. Amer. Forestry 28: 12-19. 14 fig. 1922.—This is a popular article.—Chas. H. Otis.

2381. ILLICK, J. S. The sycamores. Amer. Forestry 28: 145-150. 10 fig. 1922.—This is a popular description of *Platanus occidentalis*.—Chas. H. Otis.

2382. JÄPING. *Natürliche Verjüngung und damit Stetigkeit des Waldwesens auf der ganzen Waldfläche.* [Natural regeneration and resultant stability of forest life over the entire forest area.] *Zeitschr. Forst- u. Jagdw.* 53: 45-55. 1921.—The state forester discusses the silvicultural methods and problem of natural regeneration at Strassebersbach in his own district. He states that permanency of forest nature on the whole working area results in the retention of the highest soil productivity. The problem is to secure or keep the optimum conditions for the most suitable tree species and to retain this condition continuously in order to secure the highest wood production. As opposed to the even-aged stand the selection stand enables the best trees to develop full crowns, resulting also in greatest wood production quantitatively and qualitatively. In coniferous stands (spruce) the humus is characteristically "dead" and soil deterioration likely; this problem is met by judicious mixing with hardwood, the litter of which helps to secure quicker decomposition of the humus. In hardwoods, notably beech, the system adopted is the wide seed felling (Breitsamenschlag), a selection cutting over the compartment, while for spruce, strip-felling (Saumschlag) should be employed.—*J. Roesser.*

2383. JOHANNSEN, W. *Orienterende Forsøg med Opbevaring af Agern og Bøgeolden.* [Experiments in storing acorns and beech-nuts.] *Forst. Forsøgsv. Danmark* 5: 372-390. 1921.—Low temperature is necessary to keep acorns in a state capable of germinating. To what extent frost may be endured has not been tested. Storing at a temperature between 1 and 2°C. gave quite good results. Another necessary condition is access of air, otherwise the power of germination, even at the low temperature mentioned above, is lost in about 1 year. A solution of sublimate as a fungicide proved favorable; probably also copper sulphate could be used. Treatment with formalin solutions does not seem to be practical. It has been possible to keep acorns for more than 3 years, with, however, a gradually decreasing power of germination. From the surviving seed, a number of vigorous plants may grow up. Beech-nuts are easily poisoned by the use of fungicides, but in a cold storage-room may otherwise keep fairly sound for 1 or 2 winters. After close sowing a rather marked correlation exists between the size attained by the young oak-trees during the 1st year and that attained after 10 year's growth, but their interdependence is far from being invariable.—*J. A. Larsen.*

2384. KORDVAHR. *Individualismus und Sozialismus in der Forstwirtschaft.* [Individualism and socialism in forest management.] *Zeitschr. Forst- u. Jagdw.* 53: 206-210. 1921.—Forest management can assist Germany considerably if the principles of highest net yield on forest capital are followed. The highest net yield from soil capital management is management for selfish interests,—the strict carrying out of individualistic principles. The highest net yield from forest capital management provides the greatest benefit of the whole and places the success of the whole over the gain of the individual.—*J. Roesser.*

2385. LAGERBERG, TORSTEN. *Mykologiens Betydelse för vår Skogsvård och Trävaruhantering.* [The importance of mycology in forestry and the handling of forest products.] *Skogsvårdsför. Tidskr.* 19: 102-114. 1921.—This is an address given before the forest high school.—*G. A. Pearson.*

2386. LEGAT, C. E. *The propagation of trees from seed.* *Jour. Dept. Agric. Union South Africa* 4: 161-172. *Pl.* 1-3. 1922.—Directions are given for rearing trees from seed, with particular reference to the pines, Eucalypts, and Acacias.—*E. M. Doidge.*

2387. LEININGEN-WESTERBURG. *Rauchschäden und Boden.* [Relation of smoke injury to forest soil.] *Centralbl. Gesam. Forstw.* 46: 119-144. 1920.—This article appeared also in the *Forstwiss. Centralbl.* [see *Bot. Absts.* 7, Entry 459].—*R. H. Weidman.*

2388. MARG, L. MATSSON. *Märgborrens Kronska degörelse och dess Inverkan på Tallens Tillväxt.* [Damage to tree crowns by the pithborer and its influence upon increment.] *Meddel. Statens Skogsförsöksanst.* 18: 81-101. *Fig.* 1-2. 1921.—In Sweden the pithborer

(*Myelophilus piniperda*) destroys the young shoots of *Pinus sylvestris* and thus reduces the photosynthetic capacity of the crown. The reduction of leaf area is reflected in decreased growth. This investigation undertakes to establish a relationship between degree of crown injury and rate of diameter growth. A complication arises from the fact that infestations generally follow thinnings, and thus it is necessary to deal with 2 factors,—the stimulating effect of thinning and the retarding effect of crown damage. The per cent of crown injury is determined by ocular estimate checked by detailed analyses of leaf surface of a few type trees representing various degrees of infestation. Rate of diameter growth is determined by use of the accretion borer. The results show that rate of growth is in a general way inversely proportional to degree of infestation.—*G. A. Pearson.*

2389. MARTI, F. VON. *Verbauungen, Aufforstungen und Berasungen in den Einzugsgebieten der Wildbäche.* [Terracing, afforestation, and sodding for the control of irregular streams.] *Schweiz. Zeitschr. Forstw.* 72: 174-181. 1921.—Sod when packed down by snow or when frozen causes more surface run-off than terraces, and a record of terraces shows that they are adequate to equalize the run-off during heavy rainfall or rapid melting of snow. Cost of terracing is about equal to afforestation, and the terracing is more effective in controlling run-off. Where grazing is permitted among terracing the terraces should be protected by planting of suitable trees or shrubs. [See also Bot. Absts. 11, Entry 2366].—*J. V. Hofmann.*

2390. MARTIN, J. J. E. *Forêt de la Harth.* [The Harth forest.] *Bull. Trimest. Soc. Forest. Franche-Comté et Belfort* 14: 196-201. 1921.—The state forest of the Harth, in Lorraine, containing 14,000 hectares, has been under management for 150 years. Its native species comprise oak, $\frac{3}{10}$; hornbeam, $\frac{6}{10}$; and others, $\frac{1}{10}$. Linden is the best of the broad-leaf species. Scotch pine was planted extensively about 1840 and in 1900. It was first managed as coppice-under-standards, with a rotation of 35-40 years. In 1850 only 900 hectares remained in high forest. The working plan of 1860 provided for the conversion of coppice into broad-leaved high forest. Markings under this plan reserved 330-750 trees per hectare. Yields of 17 cubic m. of logs per hectare were realized. The plan of 1890 provided for the transformation into coniferous high forest. In 1910, German culture "condemned" the forest to the production of brush on a 30-year rotation, chiefly valuable for rabbit hunting, on 12,000 hectares. The yield under such a system would be 35,000 steres of small firewood and 5,000 steres of large firewood which, under existing economic conditions, is negligible.—*J. Kittredge, Jr.*

2391. MAXWELL, HU. *Wood for professional and scientific instruments.* *Amer. Forestry* 28: 151-158. 17 fig. 1922.

2392. MELL, C. D. *The importance of the jack tree.* *Bull. Pan Amer. Union* 51: 605-608. 1920.—The jackfruit tree, *Artocarpus integrifolia*, a native of the Indian Archipelago, is now widely grown throughout the tropics. Under normal conditions it may attain an age of several hundred years and measure 70-80 feet in height and over 3 feet in diameter near the base. The jackfruit tree as well as the breadfruit tree, *A. incisa*, readily recovers from the severest pruning or misuse. The fruits not required for human consumption are used for fattening cattle and sheep. Young branches are also used for feeding sheep and cattle, especially during dry seasons when fodder is scarce. When the thick bark is cut an abundance of a thick, white fluid exudes, which is used in India and Brazil as a rubber substitute. In Brazil both bark and leaves are used for medicinal purposes. The wood is very durable and valuable for carpentry, furniture, etc., though only the heartwood can be used for this purpose, the sapwood being soft and useless. The heartwood also contains a brilliant yellow dye, similar to that of the fustic tree to which the jack tree is closely related.—*M. N. Levine.*

2393. MELL, C. D. *The increasing importance of the jobo tree of tropical America.* *Bull. Pan Amer. Union* 51: 406-409. 1920.—*Spondias lutea* is known by a great many popular names in the regions and countries in which it grows. In Cuba, close to its northermost limit of

growth, it is called "jobo" (hobo), in South Brazil it goes by the name of "caja" (cã chã') The jobo is a native of the Western Hemisphere and is now widely distributed throughout the tropics as a result of artificial propagation. In appearance this tree resembles the common ash. It belongs, however, to the cashew-nut family and is closely allied to the mango tree. The jobo is commonly used as a hedge plant and is propagated by cuttings. It is also good for fence posts, paper pulp, and, to a certain extent, for interior trimming. In Venezuela, Trinidad, and the Guianas, jobo wood is the only satisfactory match-stick material now in use. The wood is relatively soft and light and is generally regarded as one of the best woods known for the uses to which it is put. The fruit of the jobo, which is shaped like a plum and is frequently $1\frac{1}{2}$ inches long, is used for making preserves and jelly, but mainly for fattening hogs.—*M. N. Levine.*

2394. MÖLLER. *Kiefern Dauerwaldwirtschaft II.* [Continuous management of pine. II.] *Zeitschr. Forst- u. Jagdw.* 53: 70-85. 1921.—The author discusses Trebeljahr's article [see Bot. Absts. 9, Entry 206] especially as to the system of continuous forest management. The new system attempts to secure a permanent forest condition (Waldwesen) over the entire area. The argument that the system can not be practiced on an extensive scale is based on the erroneous belief that the stand must be regenerated or reproduced naturally. The basic principles of the system are independent of the question concerning natural and artificial regeneration.—The forester must arrange a felling plan as similar as practicable to that of the continuous management system.—*J. Roeser.*

2395. NIRSCHL, J. VON. *Über Niederländisch-Indiens Forsten und Wälder.* [The forests of the Dutch East Indies.] *Schweiz. Zeitschr. Forstw.* 72: 225-232. 1921.—The area of the island of Java is 131,000 square km. and has a population of 34 million, or 260 persons per square km. About 46 per cent of the area is cultivated and 22 per cent forested. Although densely populated the local demand for forest products is very small, very little wood being used for fuel or dwellings. One of the chief uses of wood is for road construction. Teak is the principal species. The Indian oak is also an important commercial tree and reaches a height of 40 m. and a diameter of 100 cm. The practice of growing understory forests or cultivation is not feasible with teak because the species produces shoots 2 m. high the 1st season and the large leaves cast a heavy shade.—The east end of the island is much drier than the west, although the entire island has a dry season from May to October during the east monsoon winds. During the dry season the trees shed their leaves and have a resting period equivalent to a winter season.—The forest force consists of 93 persons divided as follows: forest administrator, chief inspector, 4 forest inspectors, 58 assistant foresters; forest improvement, 1 inspector, 19 assistant foresters; rubber products, 1 inspector, 3 assistant foresters; research, director, 5 assistant foresters. The outlying areas are manned by 1 inspector and 8 assistants. Including all forest laborers the force totals 1,421. The technical force should be increased to facilitate timber sales based on stumpage value and to insure better silvicultural methods.—*J. V. Hofmann.*

2396. OBERDIECK. *Weder Bodenreinertrags- noch Waldreinertrags- sondern Bedarfs-Wirtschaft.* [Not management of highest net return on soil capital or highest net return on forest capital but management based on demand and necessity.] *Zeitschr. Forst- u. Jagdw.* 53: 143-144. 1921.—The author is convinced that the chief factor in determining the rotation age must be demand (general or local) modified to some extent by concessions to the theory of management based on highest net return on forest capital. As a student of Borggreves he believes in a platform of intensive management with early, oft-recurring, adequately conducted thinnings, and with a thorough utilization of the light and value increment during the regeneration period.—*J. Roeser.*

2397. OSMASTON, B. B. *Report on the forest administration of the Central Provinces [India] for the year 1918-19, together with the quinquennial review for the period ending with the year 1918-19.* 22 + 6 + lxxxv p. 1920.—This annual report covers in some detail all forest

operations. The area of forest has remained constant at 19,645 square miles, of which 16,545 are under approved working plans and 9,700 under fire protection. Considerable progress was made in construction of new roads, which results in an immediate increased income and greater utilization of forest products. Grazing and cutting trespasses apparently decreased in number over the 3-year average, due in part to incomplete reporting. A large part of the forest officers time was devoted to procuring hay for the army. The total number of stock grazed was 3,244,709, a decrease of 190,000 from the previous year. Over half of the decrease was in sheep and goats, which is not regarded as serious. A general seeding of katang bamboo occurred, the 1st since 1885. Cultural operations were carried out on 36,104 acres of forest, about 4,000 acres more than in the previous year. Some planting work is in progress. A total of 208,338 acres were cut-over, as compared to 178,399 in the year before. Practically all of these were classed as improvement fellings and coppice with standards. An increase in the value of minor products is noted. Most of the exploitation was under departmental direction. The net revenue of Rs 14,35,105 shows a decrease over the previous year. The year's administration was seriously hampered by extra activities occasioned by the war, the loan of personnel to the army, and to the heavy mortality among the permanent force due to the influenza epidemic. A comparative study of the 1st and last years of the 5-year period 1914-1919 is given. The usual detailed tabulations of areas of reserved lands, progress in forest settlements, demarcation of boundaries, improvements, utilization, income, etc., are appended.—*S. B. Show.*

2398. PACK, A. N. Seeds of international friendship. *Amer. Forestry* 28: 3-7. 12 fig. 1922.—This, the 2nd of a series, tells what was done by Great Britain, France, and Belgium with the American tree seed donated by the American Forestry Association to aid in restoring the forests destroyed by the war.—*Chas. H. Otis.*

2399. PACK, A. N. The vanishing trail. *Amer. Forestry* 28: 67-69. 5 fig. 1922.—This, the 3rd of a series of articles on European forestry conditions, describes the aftermath of cuttings in France by the Twentieth (Forestry) Regiment.—*Chas. H. Otis.*

2400. PAERELS, J. J. Een der belangrijkste boschproducten uit Indie. [One of the principal forest products of India.] *Cultura* 33: 316-320. 1921.—The production of benzoe resin from *Styrax* species, especially *S. Benzoin*, in the Dutch East Indies is considered. Important plantations are found in Palembang and Tapanoei, Sumatra.—*J. C. Th. Uphof.*

2401. PAERELS, J. J. Eenige looi en verfstoffen uit Nederlandsch Indië. [Some tannin and dye stuffs from the Dutch East Indies.] *Cultura* 33: 270-277. 1921.—*Uncaria Gambir* produces gambir, an important tannin. It is obtained from the sediment after the leaves have been boiled. Cultivation in relation to soil and climate is easy. Rain of 3000 mm. per year is most favorable. There are 25,000 seed in 1 gm. Thick sowing is advised, with protection from the sun. Seed germinates in 14 days. Leaves are harvested after 1-2 years. Tannin from the mangrove species are obtained especially from *Rhizophora mucronata*, *R. conjugata*, *Bruguiera gymnorhiza*, *Carapa moluccensis*, and *C. obovata*. *Morinda citrifolia* produces a red dye used in coloring cloth in India. The bark of *Peltophorum ferrugineum* is used in mixtures as a dye. The bark of *Acacia leucophloea* produces a tannin which is extensively used in Java for leather. *Cassia Fistula* produces Trenggoeli bark which contains 9-15 per cent of tannin and makes excellent leather.—*J. C. Th. Uphof.*

2402. PAINE, V. B. Logging mahogany in tropical West Africa. *Amer. Forestry* 28: 131-141. 12 fig. 1922.—The author graphically describes methods by which logs are gathered in large quantities, brought to the shipping point by manual labor, and placed on board steamers.—*Chas. H. Otis.*

2403. PATTON, R. T. On the seasoning of hardwoods. *Proc. Roy. Soc. Victoria* 32: 350-353. 1920.—This supplements previous work on mountain ash (*Eucalyptus regnans*).

This species and messmate (*E. oblique*) were used. The results agree with those previously obtained. No acceleration of drying was observed after steaming. Shrinkage, however, was increased. The suddenly dried material gave least shrinkage but the ultimate rate of drying was not affected. Shrinkage in length was very small ($\frac{1}{8}$ inch in 6 feet). For mountain ash radial shrinkage was 5 per cent and tangential 8 per cent. For messmate it was 6 and 8 per cent respectively. Boards 1 inch by 6 inches by 6 feet dried in 4 weeks during the summer to a 12 per cent moisture content.—*Eloise Gerry*.

2404. PETRINI, SVEN. Ett modernt Avverknings-system—Schirmkeilschlag contra Wagnerblädning. [A modern system of cutting—shelterwedge-cutting vs. Wagner selection.] Skogsvårdsför. Tidskr. 19: 115–128. Fig. 1–2. 1921.—Eberhard's method which deals mainly with silver fir utilizes primarily 2 types of operations, thinning and soil preparation. Silver fir should be thinned often and lightly. Large openings encourage weeds and windfall. The interval between thinnings varies from 1 to 3 years. Frequent thinnings are especially important in the reproduction stage. Reproduction is introduced 20–25 years before the end of the rotation. The litter is removed, then the mineral soil is exposed in strips. At intervals 1–1½ m. in these strips, squares of $\frac{1}{2}$ m. are hoed to a depth of 40 cm. Light must be introduced gradually in order to permit adaptation and to hold the weeds in check. Weeds can be controlled in this way because they endure less shade than the fir or spruce seedlings. Reproduction develops with the gradual introduction of light by thinning or light cutting until it is securely established. Up to this point all cuttings are classed as "preparatory;" later ones are designated "after cuttings." As in the case of preparatory cuttings, after cuttings should be frequent, preferably every year, until the stand has been converted into a young forest. The direction in which the regeneration proceeds over a unit depends upon 3 considerations,—prevailing wind direction, aspect of the site, and the direction in which the material is to be hauled. On account of danger from windfall, cutting usually proceeds from east to west, but on slopes this may be varied. Logs must not be skidded or hauled through a stand which has been restocked. In order to avoid suddenly opening up large spaces, the cutting areas take the form of wedges, the point of which is directed toward the west,—hence the name "Schirmkeilschlagbetrieb." Wedges are started at intervals of 80–120 m. The rate of cutting and regeneration can be regulated by increasing or decreasing the number and interval between wedges. At first, the wedges are very narrow and long, but as the cutting progresses they are widened until adjoining wedges coalesce. The method is especially adapted to silver fir because seedlings of this species may remain suppressed for 25 years, and when released spring up. Often the seedlings start in the virgin stand before cutting is begun, but they develop only as cutting proceeds.—*G. A. Pearson*.

2405. PODHORSKY, J. Die Korsische Kiefer, *Pinus laricio* var. *Poiretiana*. Eine forstliche Studie über ihr Verhalten in ihrer Heimat und ihre Eignung für den Anbau in Mittel-Europa. [The Corsican pine, *Pinus laricio* var. *Poiretiana*. A forest study of the requirements in its native habitat and its adaptability for introduction into central Europe.] Schweiz. Zeitschr. Forstw. 72: 171–174, 201–205, 232–238. 1 pl. 1921.—The variety is a native of the island of Corsica, where it still occurs in pure, well developed stands. Its range is from 900 to 1,700 m. above sea level, with *P. pinaster* from 500 to 900 m., *Fagus sylvatica* from 1,100 to 1,400 m., and *Abies pectinata* from 1,100 to 1,600 m. The climatic conditions are similar to the Alps of southern Switzerland and the soil is of the same granitic origin. The variety has produced better growth and larger trees in central Europe than in its native habitat. It endures shade very well, although in forest stands the trunks are cleared of branches. It has been the most successful tree that has been introduced into Central Europe. The soil and climatic conditions of southern Switzerland are more favorable than the sections where it has been grown successfully. Consequently it should prove to be a desirable species for use in protection forests in the high altitudes of Switzerland, and as a timber tree in the better localities.—*J. V. Hofmann*.

2406. PULFER. Über die Wertberechnung des Plenterwaldes. [Valuation of mature forests.] Schweiz. Zeitschr. Forstw. 72: 161–171. 1921.—There would be no difficulty in

determining values if land values and stand values could be separated. This is possible where each unit comprises a separate age class, but where the age classes occur in mixture, separate evaluations of land and stands of timber can not be made because the time of maturity of the mixed age classes can not be used as a factor. Diameter classes would form a better basis than age classes, since diameter and age are not consistent in a mixture of age classes. Diameter classes based on 20–30 cm., 35–50 cm., and over 55 cm. are suggested.—It is essential that valuation be based on actual yield rather than on yield based on silvicultural methods. Valuations are based on maximum land rentals, and variations from the maximum are correlated through the diameter classes and future yield.—Formulas are included for the determination of land valuation, rentals, stand values, normal and actual yield.—*J. V. Hofmann.*

2407. RAVE. *Die neuen Kontrollbuchanweisungen.* [New control book instructions.] *Zeitschr. Forst- u. Jagdw.* 52: 415–420. 1920.—This is a constructive critique of the new instructions issued to German foresters.—*A. H. Graves.*

2408. RECORD, S. J. *Our tropical timber trade.* *Sci. Amer.* 124: 444, 455. 5 fig. 1921.—The author briefly considers the sources, methods of logging, characteristics, and uses of the staple tropical trade woods.—*Chas. H. Otis.*

2409. RECORD, SAMUEL J. *Boxwoods of commerce.* *Bull. Torrey Bot. Club* 48: 297–306. Fig. 1. 1921.—A discussion is given of the species furnishing the boxwoods of commerce, with their geographic ranges and botanical affinities. The uses of the woods, the appearance of the logs and bark, a key to the woods, and a check-list of the common names are given.—*P. A. Munz.*

2410. ROIG, JUAN T. *Sobre reformas en la reglamentación forestal.* [About reforms in forest legislation.] *Rev. Agric. Com. y Trab.* [Cuba] 4: 566–567. 1921.—It is suggested that the cutting of young pines for poles and the topping of palms should be prohibited. Prohibition should be absolute with regard to ebony, sabin, and walnut, and limited with regard to trees which have not reached their maximum growth. A regulation of general character and application should be enforced by which trees will cut to a minimum diameter. Temporarily 4 or 5 classes of dimensions are suggested each with minimum diameters in accordance with the use to be made of the wood; *i.e.*, sizes for poles, posts, rollers, cross ties, and boards. Notes on the habitat of the red mango are given.—*G. R. Hoerner.*

2411. ROTH, J. *Maifrostschäden an Exoten.* [May frost damage to exotics.] *Centralbl. Gesam. Forstw.* 46: 151–161. 1920.—A very severe May frost caused great damage to trees at Selmechanya, Hungary. The temperature reached -4°C . Observations were made in plantations and arboreta where trees were 1–6 m. tall. Most exotic *Abies* suffered very little, especially *A. balsamea*, while the native *A. pectinata* as well as *A. grandis* suffered heavily. *Picea* with the exception of *P. Engelmanni* and *P. sitchensis* suffered very little. Contrary to accepted opinion, the “green” Douglas fir suffered slightly compared with the “gray” variety. With the exception of *Pinus flexilis* and *P. monticola*, pines suffered only slightly, with the following entirely undamaged: *P. aristata*, *P. Banksiana*, *P. contorta*, *P. Coulteri*, *P. inops*, *P. Jeffreyi*, *P. leukodermis*, *P. Murrayana*, *P. montana*, *P. ucinata*, *P. ponderosa*, *P. rigida*, *P. scopulorum*, and *P. Strobus*, *Taxodium distichum*, *Thuja gigantea*, *Tsuga canadensis*, and *T. heterophylla* were badly damaged; *Juniperus virginiana* and *Libocedrus decurrens* were undamaged; *Sequoia gigantea*, *Thuja occidentalis*, *Chamaecyparis Lawsoniana*, and *C. Nootkatensis* suffered only slightly. Late frost is not so dangerous to hardwoods as to conifers, as the former recover from frost readily. The unusual hardness of so many exotic pines is of great significance to Hungary, because among these are doubtless many that can be used successfully in afforesting the waste lands and sand dunes which are annually subject to late and early frosts.—*R. H. Weidman.*

2412. SAGE, H. *The Royal palm.* *Amer. Forestry* 28: 85–88. 5 fig. 1922.—This is a popular description of *Oreodoxa regia* as it grows in Florida.—*Chas. H. Otis.*

2413. SCHADELIN, W. VON. *Arbeiterfürsorge in der Forstwirtschaft*. [Provisions for forest workers.] Schweiz. Zeitschr. Forst. 72: 323-338. 1921.—The salary of the forester is stable and is based on ability rated by experience and examination. Although the salary is the principal compensation, there are several other benefits, viz: (1) natural provisions; (2) improvement of labor conditions; (3) sick and accident benefits; (4) retirement provisions for invalidism and old age. The provisions furnished should include use of timber for fuel, construction and repair at a low cost, whereas at present this is not allowed. Houses for the permanent locations and suitable temporary quarters should be provided; also sufficient ground for garden, orchard, and pasturage for at least 2 cows. Quarters for laborers, where the work is some distance from the residences, should be provided. Tools should be provided by the laborer since this insures better care of and satisfaction with the tools. Shelter and storage for tools should be provided.—*J. V. Hofmann*.

2414. SCHAEFFER, A. *Mécanisme de conversion—Taux de réalisation*. [Mechanism of conversion—rate of realization.] Bull. Trimest. Soc. Forest. Franche-Comté et Belfort 14: 201-205. 1921.—This is an attempt to answer the question as to what part of the volume of the forest principal can be exploited on a given forest area, with the certainty of again finding the initial volume at the time of returning for a future cut. Let V equal the volume before cutting, X the fractional part of the volume to be exploited, t the increment, and n the period in years. Then $(V - Vx)(1 + t)^n = V$. This is the formula for determining the future return on a given sum at compound interest on the condition that the capital be replaced in a certain number of years. Simplified, the formula becomes $X = 1 - \frac{1}{(1 + t)^n}$. Several examples are given of the application of the method.—*J. Kittredge, Jr.*

2415. SCHILLING. [REV. OF: RUBBER, KONRAD. *Die Bewegung der Holzpreise in Deutschland*. (The trend of forest product prices in Germany.) 124 p. J. Neuman: Neudamm, 1920.] Zeitschr. Forst- u. Jagdw. 53: 121-123. 1921.—This is a brief critique of various ideas from the book, which discusses the relation of prices and general economic conditions.—*J. Roesser*.

2416. STEPHAN. *Steigerung der Holzerzeugung Preussens durch Förderung der Oedlandsaufforstung, betrachtet vom volkswirtschaftlichen und finanztechnischen Standpunkt unter Hinweis auf die forstlichen Verhältnisse Englands*. [Increasing Prussia's wood production through furthering the afforestation of barren lands, considered from a politico-economic and finance-technical standpoint with reference to the forest conditions of England.] Zeitschr. Forst- u. Jagdw. 53: 25-38, 101-113. 1921.—England's problem is discussed, and the present (1917) forest policy stated. The afforestation of denuded lands in Prussia is primarily a matter of mine timber production. The increased rentability of barren-land afforestation rests upon the fact that the mine timber dealer, even in the remote sections of Prussia, can be considered a purchaser upon the steady increase in prices of and demand for mine timber, which has become so great as to necessitate importation. A plan in 2 parts is outlined by which afforestation may be carried out on an extensive scale: (1) a scheme of afforestation by the owners without state help, and (2) afforestation by the owner with state assistance consisting of district or province loans for which the state is surety. The 2nd instalment of the article considers the capitalization of areas to be afforested; liquidation of owner's indebtedness to state; duties of private land owners under the loaning system; conditions under which reduction in the liquidation quota because of insufficient yields may be considered; conditions under which private lands may be expropriated; and the general policy of the proposed scheme, which is to secure the greatest possible afforestation of barren lands and to prevent increased devastation, without introducing a system of direct state supervision over private forests, and with the minimum expenditure of state funds.—*J. Roesser*.

2417. STEPHENSON, H. T. *Trees in winter*. Amer. Forestry 28: 79-84. 19 fig. 1922.—This is a popular article.—*Chas. H. Otis*.

2418. TOUMÉY, J. W. Town forests. Amer. Forestry 28: 96, 113. 1922.—This address was delivered before the Massachusetts Forestry Association.—*Chas. H. Otis.*

2419. TRAGARDH, IVAR. Undersökningar över den Större Märgborren, dess Skadegörelse och Bekämpande. [Investigations of the large pithborer, damage and means of control.] Meddel. Statens Skogsförsöksanst. 18: 1-80. Fig. 1-27. 1921.—This insect (*Myelophilus piniperda*) attacks both the trunk and the crown of the Scotch pine (*Pinus sylvestris*) in Sweden. The larvae hatch from eggs laid in vertical galleries underneath the bark and work laterally, girdling the tree more or less completely. When the beetles emerge they bore into the 1st and 2nd year shoots and hollow out the interior, thus killing the portion above the point of attack. The shoots are attacked early in the summer by adults after oviposition, and later by the young brood. Injured or suppressed trees offer most favorable conditions for breeding because vigorous trees fill the galleries by excessive exudation of pitch. Repeated attacks on the crown may so reduce the vitality of a tree as to render its stem subject to attack. In virgin stands the insects are usually present only in small numbers because they find but few trees in which they can propagate. Complete eradication in such stands may usually be accomplished by removing all suppressed and injured trees. Epidemics often follow thinnings unless material over 3.5 cm. in diameter is removed or barked. Stems below this diameter are attacked, but the broods do not develop. After cutting, seed trees are subject to severe attack because great numbers of insects are reared in the stumps. Logs become breeding places only under certain conditions. Since the eggs are deposited prior to June 1, material cut during the summer can be left in the woods without danger. Material cut after September 1 and not exposed to the sun is likely to be attacked the following spring. Both logs and stumps can be rendered harmless as breeding places by peeling the bark.—*G. A. Pearson.*

2420. WEIBECKE. Ostdeutscher Kiefernwald. Seine Erneuerung und Erhaltung. [East German pine forests. Their renewal and retention.] Zeitschr. Forst- u. Jagdw. 53: 5-25, 85-101, 145-154, 214-237. 1921.—The present intensive system of even-aged stands and clear-cutting is well established and the problem concerns itself with the best methods of carrying out the system. Clear-cutting in strips from north to south, which appears the most advisable, is discussed in detail, along with various silvicultural and logging requirements.—The 2nd installment considers the subject of soil preparation in pine stands for providing a desirable seed bed. The work is divided into 3 groups: (1) opening the soil, or merely removing or shaking free surface vegetation; (2) loosening and mixing soil and humus; (3) turning over the soil by deep plowing. The use of the plow is unnecessary, unprofitable, and harmful. Studies have shown that the best developed individuals in a stand are those with well-developed superficial root systems, not deeply penetrating ones. The work of soil preparation should be done in winter, not later than March. The desirability, choice, and application of cultural method in the use of implements are discussed. Their use is governed by the necessity of securing good but cheap labor. In the 3rd section, the history of planting pine in Germany is briefly reviewed, followed by an elaborate discussion of the physiology of the root system, the natural development of the root system of the pine, and root formations departing from the natural as occasioned by various cultural methods of planting and sowing. The conclusions are: Planting pine should be discontinued or at least every effort made to limit its use because its general effects are injurious. Best results are and will continue to be secured from natural regeneration on prepared and receptive forest soil, supplemented by cultivation over the entire area, or, at most, the preparation of shallow furrows with a careful mixing of as high an amount of humus as can be obtained in which pine seed of the best origin should be sparsely sown.—In the 4th installment, the author continues his treatise on cultural methods of treating forest soil. The complete turning over of the soil by deep plowing is usually harmful in the original forest. Any form of furrow culture is a compromise. It is best to keep a fresh, fertile soil over the entire regeneration area. Where furrows are plowed, a maximum distance of 1.3 is advised. The cultural manuring of plantations or crop rotation is not necessary on original forest soil. It is essential to keep the decomposing humus in use for wood production and not for the nourishment of sedges, heather, and weeds. In the 10th chapter,

the author discusses labor and costs of various operations, considering especially the amount of work required in various ways of turning the soil.—*J. Roesser.*

2421. WIBECK, EDVARD. Om Olika Skogsodlingsmetoders Förhållande till Uppfrysningsskadan. [The relation of different methods of forest culture to damage by frost heaving.] Meddel. Statens Skogsförsöksanst. 17: 330-345. Fig. 1-3. 1919.—In 1916-18, experiments on the relation of deep and shallow cultivation to survival in planting and direct seeding were conducted in Norrland, Sweden. The seeding was in spots 16 × 16 inches or strips 4 × 16 inches. Under shallow cultivation merely the surface was cleared, exposing the mineral soil, while in deep cultivation the soil was loosened to a depth of 6 inches. Planting was in narrow holes made with a bar, or in wide holes. Contrary to the experience in southern Sweden the shallow spots and narrow holes gave the best results. Investigations showed that losses were due primarily to frost heaving, which is most severe in deep spots and wide holes. These effects were more noticeable on soil covered by lichens and herbaceous plants than on that covered with a deep layer of moss. The conclusion is that while cultivation generally favors the growth of seedlings, this advantage may be more than offset in Norrland by damage due to heaving. Heaving is favored by standing surface water and oscillating low temperatures, conditions which are characteristic of the extreme north and mountain regions.—*G. A. Pearson.*

2422. WIDEGREN, K. A. Transportbane-system Widegren. [The Widegren transportation system.] Skogsvårdsför. Tidskr. 19: 133-143. Fig. 1-9. 1921.—The article discusses the working of an experimental wooden railway system previously described, and also of 2 lines used in practical woods operations.—*G. A. Pearson.*

2423. WILBER, C. P. The foundation for forestry in New Jersey. Amer. Forestry 28: 20-24, 30. 6 fig. 1922.—This article deals largely with fire protection.—*Chas. H. Otis.*

2424. WILBRAND. Ideeler Waldwert. [Idealistic forest value.] Zeitschr. Forst- u. Jagdw. 53: 65-69. 1921.—A few recent cases have made it possible to judge to some extent the value placed upon the forest by the people in general, who place its esthetic value higher than its actual value in wood. The instance discussed is the selling of the Zehn Morgenwald, near Frankfurt, for exploitation. Within 12 years the value of this tract had increased from 25,000 to 475,000 M., the increase expressing the change in value because of the esthetic and recreational use.—*J. Roesser.*

2425. WILBRAND. Kulturkosten. [Cultural expenses.] Zeitschr. Forst- u. Jagdw. 53: 210-214. 1921.—The cost of replacing a forest stand is closely connected with the revenue derived from removal of the final product, and the cost should come out of the final yield as does the labor cost of felling. It is not the forester's duty to cultivate as cheaply as possible as the soil rental adherents dictate, but he should bring the forest soil to the highest state of productivity as quickly as possible; and this can be done only by careful planting and cultivation. The fullest use of the forest can not be secured if the management is governed by the highest return on soil capital theory. Since it is necessary to bring cultures and plantations as rapidly as possible through the period of greatest danger in the life of the tree, artificial regeneration will usually be preferred.—*J. Roesser.*

2426. WILMOT, G. A. Matches and matchwood production. South African Jour. Indust. 4: 826-837. 10 fig. 1921.—This is a detailed account of the match-making industry of South Africa. The 2 factories described are Rosebank and Stamford Hill, where over 800 employees are engaged in the manufacture of boxed matches. A description of the whole process is given from the felling of the tree to the turning out of packed boxes. The main object of the article is to encourage more extensive afforestation. An immense amount of wood is imported from Russia, Canada, and the U. S. A., but there is no reason why all the timber required for this and many other industries should not be produced locally.—*S. M. Stent.*

2427. WIRZ-LUCHSINGER, VON. Forstbotanische Beobachtungen aus dem Kanton Glarus. Die Arve. [Forest botanical studies in the Canton of Glarus. The Cembra pine.] Schweiz. Zeitschr. Forstw. 72: 193-201. 1921.—Cembra pine (*Pinus cembra* L.) is scattered and has never formed forest stands. Individual specimens occur among *P. montana* Mill., and rhododendrons, willows, vaccinium, and *Aquilegia alpina* L. Cembra pine occurs at elevations up to 1,900 m. The erratic distribution and occurrence in small groups or individuals is attributed to seed distribution and planting by birds and mice, and in some localities to man. The seed is eagerly sought by birds and mice and is collected and cached even before maturity. —A distribution map of Cembra pine in the Canton of Glarus is included, and probable reasons for its occurrence in each locality are discussed.—J. V. Hofmann.

GENETICS

GEORGE H. SHULL, *Editor*

JAMES P. KELLY, *Assistant Editor*

(See also in this issue Entries 2072, 2092, 2100, 2101, 2102, 2104, 2178, 2188, 2202, 2262, 2280, 2374, 2528, 2563, 2567, 2570, 2580, 2617, 2627, 2630, 2635, 2638, 2661, 2760, 2780, 2798, 2853, 2876, 2893, 2899, 2923, 2997, 3019, 3033, 3082, 3093, 3104, 3202, 3203, 3204, 3208, 3214, 3241, 3242)

2428. ANONYMOUS. British roses and hybridity. *Nature* 108: 99-100. 1921.—The writer reviews briefly some of the facts presented by Harrison and Blackburn [see Bot. Absts, 9, Entry 738] on the hybridity of British roses and their cytology. He also considers the work of J. R. Matthews [New Phytol. 19: 153-171. 1920] and Cole [Bot. Gaz. 1917]. The question is raised as to the part which crossing plays in evolution. It is held that the occurrence of similar microgenes in different species of roses is due to parallel mutations and is not an indication of orthogenesis, as Harrison believes.—A. C. Fraser.

2429. ANONYMOUS. [German rev. of: BAUR, ERWIN. Die Grundprinzipien der rein naturwissenschaftlichen Biologie und ihre Anwendung in der Physiologie und Pathologie. (The foundation principles of pure scientific biology and their application in physiology and pathology.) Roux's Vorträge u. Aufsätze 26. 75 p. 1920.] Arch. Entwicklungsmech. 50: 348. 1922.

2430. ANONYMOUS. [German rev. of: DÜRKEN, BERNHARD. Einführung in die Experimentalzoologie. (Introduction to experimental zoology.) 16 × 23 cm., x + 440 p., 224 fig. Julius Springer: Berlin, 1919.] Arch. Entwicklungsmech. 50: 348-351. 1921.

2431. ANONYMOUS. [German rev. of: DÜRKEN, BERNHARD, UND HANS SALFELD. Die Phylogenese, Fragestellungen zu ihrer exakten Erforschung. (Phylogenesis, outline of questions for its exact investigation.) 59 p. Gebrüder Borntraeger: Berlin, 1921.] Anat. Anzeiger 55: 189-190. 1922.

2432. ANONYMOUS. [German rev. of: KAMMERER, PAUL. Das Gesetz der Serie. Eine Lehre von den Wiederholungen im Lebens- und im Weltgeschehen. (The law of series. A doctrine of the repetitions in life and world phenomena.) 17 × 23 cm., 486 p., 8 pl., 26 fig. Deutsche Verlag-Anstalt: Stuttgart-Berlin, 1919.] Arch. Entwicklungsmech. 50: 348-346. 1922.

2433. ANONYMOUS. [German rev. of: LENZ, FRITZ. Grundriss der menschlichen Erblichkeitslehre und Rassenhygiene. II. (Fundamentals of human genetics and eugenics II.) J. F. Lehmanns: Munich, 1921.] Anat. Anzeiger 55: 223. 1922.

2434. ANONYMOUS. [German rev. of: MORGAN, T. H. Die stoffliche Grundlage der Vererbung. (The material basis of heredity.) Translation by Nachtsheim, H. 291 p., 118 fig. Gebrüder Borntraeger: Berlin, 1921.] Anat. Anzeiger 55: 190. 1922.

2435. ANONYMOUS. **Improvement of the race.** [Rev. of: POPENOE, PAUL, AND R. H. JOHNSON. *Applied eugenics*. 14 × 20 cm., xii + 459 p., 46 fig. Macmillan Co.: New York and London, 1918 (see Bot. Absts. 3, Entry 279).] *Nature* 106: 752-753. 1921.

2436. ANTONIUS, O. [German rev. of: ADAMETZ, LEOPOLD. *Herkunft und Wanderungen der Hamiten, erschlossen aus ihren Haustierrassen*. (Origin and wanderings of the Hamites determined from their domestic animals.) *Osten u. Orient* 2: 109 p. 24 pl., 44 fig. 1920.] *Zeitschr. Indukt. Abstamm.- u. Vererb.* 28: 247-248. 1922.

2437. BANNIER, J. P. [Dutch rev. of: HAGEDOORN, AREND L., AND A. C. HAGEDOORN-VORSTHEUVEL LA BRAND. *The relative value of the processes causing evolution*. 14 × 24 cm., 294 p., 20 fig. Martinus Nijhoff: The Hague, 1921.] *Genetica* 4: 87-95. 1922.

2438. BATESON, W. **The determination of sex.** [Rev. of: GOLDSCHMIDT, RICHARD. *Mechanismus und Physiologie der Geschlechtsbestimmung*. (Mechanism and physiology of sex determination.) viii + 251 p. Gebrüder Borntraeger: Berlin, 1920.] *Nature* 106: 719-721. 1921.

2439. BAYLISS, W. M. **The hormone theory of heredity.** [Rev. of: CUNNINGHAM, J. T. *Hormones and heredity: A discussion of the evolution of adaptations and the evolution of species*. xx + 246 p., 3 pl. Constable and Co.: London, 1921.] *Nature* 109: 35-37. 1922.

2440. BOTTAZZI, FILIPPO. [Rev. of: STEINACH, E. *Verjüngung durch experimentelle Neubelebung der alternden Pubertätsdrüse*. (Rejuvenation through experimental revitalization of the senile sex glands.) 68 p., 9 pl. Julius Springer: Berlin, 1920.] *Scientia* 31: 246-248. 1922.

2441. BRIDGES, CALVIN B. **Genetical and cytological proof of non-disjunction of the fourth chromosome of *Drosophila melanogaster*.** *Proc. Nation. Acad. Sci. [U. S. A.]* 7: 186-192. 1 fig. 1921.—The author's previous work demonstrated that the sex (or 1st) chromosome carried the sex-linked genes and the present study establishes a similar relation for 1 of the autosomes, i.e., the small chromosome pair for which only 2 genes are known. A mutant type called "diminished" gave genetic results indicating deficiency of the 4th chromosome. Cytological study of dividing cells in such individuals showed clearly that only 1 small chromosome was present. Triploid 4th-chromosome individuals have also occurred secondarily. The haploid nature of diminished has made it possible to determine the percentage of crossing over between the 2 4th-chromosome genes, even though the double recessive stock has not yet been secured. Female flies heterozygous for both these characters are crossed with diminished males, and the diminished offspring show any crossovers which have occurred. The value is stated to be "the equivalent of 0.86 ± 0.14 per cent of crossing over." Text figures of the haploid 4th-chromosome metaphase plates appear in this paper, but detailed genetic data are not given.—H. H. Plough.

2442. CARRARA, M. [French rev. of: CONKLIN, E. G. *L'hérédité et le milieu. Leur rôle dans le développement de l'homme*. (Heredity and environment. Their rôle in the development of man.) 16 mo., 295 p., 43 fig. Flammarion: Paris, 1920 (see Bot. Absts. 4, Entry 547).] *Scientia* 31: 318-319. 1922.

2443. CASTLE, W. E. **A new type of inheritance.** *Science* 53: 339-342. 1921.—The paper has reference to investigations of J. Schmidt on "the millions fish," *Lebistes reticulatus*, [see Bot. Absts. 10, Entry 1748] and presents a "hypothetical outline of the evolution of sex-linked inheritance."—Schmidt discovered 2 races of *Lebistes*: one in which only males have a conspicuous black spot on the dorsal fin; the other in which the spot is wanting in both males and females. Spotted male begets sons all like himself, regardless of mother's ancestry. The spot can not be inherited through females of either race. Hence the spot is strictly sex-limited

in the 1st-mentioned race, and the sperm that are "male-determining" must be the "sole vehicle of its transmission." "It therefore has, as Schmidt points out, exactly the distribution of a Y chromosome, and he suggests that a Y chromosome may be the vehicle of transmission * * *."—Castle recalls his earlier (1909) suggestion that the Y chromosome afforded a suitable vehicle for transmitting the sex characters of males and renews the suggestion that "the Y chromosome may contain the clew to the explanation of that * * * type of sex-linked inheritance found in *Abraxas* and * * * in poultry." He then discusses the rôle of X and Y chromosomes in sex determination and suggests a possible origin of *Drosophila*, poultry, and *Lebistes* types of sex-linked inheritance. With reference to the latter he says: "If in the *Drosophila* type of inheritance, Y should come to contain genes, these would be handed on from father to son, without ever entering a female zygote (*Lebistes* type). In the poultry type of sex-linked inheritance, Y would not afford a suitable mechanism for this one-sided inheritance, since Y there passes into females. Hence the *Lebistes* type must be a further evolution of the *Drosophila* and human type, not of the poultry type."—A. W. Bellamy.

2444. COLLINS, G. N. Teosinte in Mexico. Jour. Heredity 12: 338-350. *Frontispiece and pl. 1-7*. 1921.—Results are reported of an expedition to Mexico made by the author and J. H. Kempton to study the wild forms of teosinte (*Euchlaena mexicana* Schrad.) and the natural hybrids of teosinte with maize. Annual teosinte was found in the States of Durango and of Mexico, and a perennial form in Jalisco. Although teosinte and maize were growing in close proximity there was little evidence of natural hybridization. Since the annual forms of teosinte occupy a position between perennial teosinte and maize and since at least 1 form of annual teosinte is distinguished from the others by characters which it shares with the maize of the region in which it grows, it is suggested that the annual types of teosinte may have originated from hybrids between perennial teosinte and maize. Living plants were introduced into the U. S. A. for hybridization studies.—G. N. Collins.

2445. CUMMINGS, M. B. First 15 years of a 40-variety apple orchard: Apple scion selection. Vermont Agric. Exp. Sta. Bull. 221. 38 p., 4 pl., 5 fig. 1921.—In 1904 a 40-variety orchard was set for the purpose of making a comparative study of growth, blossoming periods, yields, winter injury, and storage endurance. Data and observations reported cover 15 years.—The orchard was given clean cultivation with cover crops, was moderately pruned, and sprayed 3 times annually. Comparative growths of varieties were determined by annual linear growth of twigs, calibration of trunk diameters, and measurement of horizontal and vertical diameters of heads. Blossom data, dates and average duration of bloom, were secured for 6 seasons. The average blossoming period in Burlington, Vermont, extends over 14 days, most varieties overlapping sufficiently to allow interpollination.—Winter injury during 1917-18 and 1918-19 was severe on Baldwin, Fallawater, Sutton, Twenty Ounce, Spitzenburg, and King, and less severe on Arctic and Rhode Island Greening, but scarcely affected other varieties under observation. Annual yield data to the end of the 15-year period include average total weight and number of apples per tree for Longfield, Yellow Transparent, Scott, Oldenburg, Fameuse, Cooper, Gravenstein, Roman Stein, Dwarf Baldwin, McIntosh, Northern Spy, and Yellow Bellflower.—Storage endurance in a basement room under recorded conditions of temperature and humidity was studied for 3 seasons. During much of the time temperatures approximated 40°F. and humidity about 75. The 3-year average storage period varied from 38 days for Red Astrachan and 154 for St. Lawrence, to 297 for Ben Davis, and 324 for Mann. Baldwin averaged 281 days, McIntosh 224, Wealthy 219, Rhode Island Greening 241, Fameuse 226, North Western Greening 236. In general the progress of decay was slow and the shrinkage small.—In 1910 an experiment was started to test the relative merits of scions derived from high- and low-yielding apple trees. Scions derived from productive trees have done no better, in fact to date have done scarcely as well, as those from unproductive trees. Another 10-year period must elapse before sufficient data are accumulated to warrant conclusions as to the basic question involved. However, those in hand clearly do not afford affirmative support to the scion selection idea.—C. S. Crandall.

2446. DART, RAYMOND A. [Rev. of: CONKLIN, E. G. *The direction of human evolution.* xiii + 247 p., Oxford University Press: London, 1921.] *Sci. Prog.* 16: 678-679. 1922.

2447. DUNLAP, KNIGHT. *Personal beauty and racial betterment.* 95 p. C. V. Mosby & Co.: St. Louis, 1920.—Beauty is the outward, visible sign of a multitude of excellencies which count in the conservation of the race. Its conditions are in part, negative; in part, positive. Among the former are absence of deformity or disease, and the latter, character of the skin and hair, muscular tonicity, and poise. Of these, poise is of chief importance as an index of the mental and spiritual potentialities of its owner. The highest types of activity are reactions in which the nervous discharge over a vast network of routes is integrated for the moment into a single function of a complex system. This high level of integration, characteristic of the specialist, does not necessarily imply the ability to maintain an efficient level under the various situations to be faced in daily life. The balance of preference for parenthood should go to the more generally integrated stock, those possessing poise, from which individuals of specific integration type may be developed as offshoots. Since human beauty is a sign of fitness for parenthood, the problem of race conservation becomes the problem of the conservation of beauty. Civilization has interfered with the conservation of desirable human qualities by setting sexual values which conflict with those of beauty, and which obscure or override them. The advantage conferred by wealth frequently obscures undesirability, so that men and women who are not fit co-parents are sought after and married. Again, the more beautiful a woman, other conditions being equal, the greater her chance of making a wealthy match; the wealthier the match, under present conditions, the less the probability of her bearing children. Thus beauty becomes an anti-eugenic force of great magnitude. The needs for racial conservation are chiefly two: (1) To insure that marriages shall be made on the basis of mutual attractiveness alone, excluding all interference of national, family, social, religious or economic motives. (2) To take care that the unions of the most fit shall be relatively more fruitful than those of the less fit. The most serious check to the reproduction of the better classes is economic and has its roots in the reduction of means of subsistence of the human race, which in turn is traceable to the unrestricted reproduction of the undesirable classes of the population. The most obvious relief measure to be found lies in decreasing the birth-rate of these classes. Although the birth-control propaganda has heretofore encountered many obstacles, many of these are likely to be removed when the social and industrial crises now threatening have become actualities. In addition to the economic checks, there are psycho-sociological checks that operate selectively against the more beautiful women as mothers of the race to be. Among these are the drawing of so many into the ranks of public entertainers and of hetairae. By the latter term are meant those who sell themselves in legalized marriage to the highest bidder for the sake of the ease and social distinction which wealth bestows. The practice also operates anti-eugenically as regards men, since the characteristics vital to the race are more and more overshadowed by the ability to provide luxuriously for a wife. War, with its evils, brought a freshening of the sexual interest of women and lent its support to a tendency to select for the race. The male personal qualities which preserve the stock once more came into the prominence they had in less civilized societies and of which modern industrialism had robbed them. The unsettling of social restraints also made for overthrow of accepted standards, and whether the total effect will be for good or ill remains to be seen. Laws, customs, and economic conditions should be so shaped as to facilitate race conservation. This shaping, and the still greater work of motivation, is to be accomplished through education and publicity directed in the service of ideals kept continually vitalized; ideals of personal values, among which beauty, in its comprehensive mental and physical interpretation, is paramount.—*W. E. Key.*

2448. DURHAM, G. B. *Inheritance of belting spotting in cattle and swine.* *Amer. Nat.* 55: 476-477. 1921.—A brief review is made of inheritance of belting in cattle and swine. The evidence supports the theory that belting spotting is due to heterozygous condition (*Ss*) for spotting. A bibliography is given.—*E. Roberts.*

2449. DÜRKEN, BERNHARD. *Korrelation und Artbegriff*. [Correlation and species concept.] *Zeitschr. Indukt. Abstamm.-u. Vererb.* 27: 27-47. 1921.—Species relationships should be based on genotypic and not phenotypic differences. The use of fossil material for species classification is discussed. Fossil material shows combinations of characters but not correlations between characters. Too much volition enters into the study of character combinations and a study of correlations between characters is necessary for species classification.—*Hally J. Sax.*

2450. EGGELING, H. VON. [German rev. of: BAUR, ERWIN, EUGEN FISCHER, UND FRITZ LENZ. *Grundriss der menschlichen Erblchkeitslehre und Rassenhygiene. I. Menschliche Erblchkeitslehre.* (Fundamentals of human genetics and race hygiene. I. Human genetics.) 16 × 22 cm., 305 p., 66 fig. J. F. Lehmann: Munich, 1921.] *Anat. Anzeiger* 55: 144. 1922.

2451. FAWCETT, FREDERICK. *Heredity and acquired characters.* *Nature* 106: 693-694. 1921.—The author reports observations in Malabar that the ratio of arm length to body height in castes which had been rowers and tree climbers for perhaps thousands of years is not greater than ordinary.—*O. A. Stevens.*

2452. FEHLINGER, H. [German rev. of: HIRSCHFELD, M. *Sexuelle Zwischenstufen. Das männliche Weib und der weibliche Mann.* (Sex intergrades. The masculine woman and the feminine man.) 279 p., 7 pl. Marcus & Weber: Bonn, 1918.] *Arch. Rass.- u. Ges. Biol.* 14: 67-68. 1922.

2453. FRANZ, V. [German rev. of: PLATE L. *Vererbung Studien an Mäusen.* (Inheritance studies on mice.) *Arch. Entwicklungsmech.* 44: 291-336. 5 fig. 1918 (see Bot. Absts. 3, Entry 658).] *Arch. Rass.- u. Ges. Biol.* 14: 64-65. 1922.

2454. FROST, HOWARD B. *An apparent case of somatic segregation involving two linked factors.* *Amer. Nat.* 55: 461-464. 1921.—A plant was observed (in a culture of *Matthiola annua*) of which the apical portion showed 2 linked recessive characters (stout branches, *s'*, and double flowers, *d*, but which was otherwise slender, *S'*, and single, *D*, and of composition $\frac{S'D}{s'd}$). The parts of the plant displaying the recessive characters arose, the author believes, as the result of a mitotic division which resulted in one daughter cell receiving both halves of the chromosome containing *s'd* but neither half of the chromosome containing *S'D*. The author also suggests that the result may have been due to a deficiency mutation, or to a duplication. The linkage relationships indicate that point mutations were not involved.—*E. Altenburg.*

2455. FRUWIRTH, C. [German rev. of: WITTE, H. *Über weibliche Sterilität beim Timotheegras (Phleum pratense L.) und ihre Erblchkeit.* (On female sterility in timothy (Phleum pratense L.) and its inheritance.) *Svensk Bot. Tidsskr.* 13: 32-43. 2 fig. 1919 (see Bot. Absts. 3, Entry 671).] *Zeitschr. Indukt. Abstamm.- u. Vererb.* 28: 248. 1922.

2456. GRAEVENITZ, LUISE VON. *Kartoffelkreuzungen.* [Potato crosses.] *Landw. Jahrb.* 55: 753-815. 1921.—A detailed account is given of potato crosses made in 1916-1978, with discussion of methods. Fifty pages are devoted to tables of descriptions of every cross, giving number of tubers, weight, form, color, skin, flesh, and eyes.—*A. J. Pieters.*

2457. HAASE-BESSELL, GERTRAUD. *Digitalis Studien II.* [Digitalis studies II.] *Zeitschr. Indukt. Abstamm.- u. Vererb.* 27: 1-26. 1921.—In this continuation of the author's previous studies of characters of *Digitalis* hybrids and their cytological behavior, the following interspecific hybrids were secured: *purpurea-ambigua*, *lutea-micrantha*, *lanata-micrantha*, *lanata-lutea*, *lanata-ambigua*, and *purpurea-lanata*. In general the hybrids were intermediate between the parents, although habit of *purpurea* was to a certain extent dominant over that of

lutea and *lanata*, and that of *lutea* and *micrantha* over that of *lanata*. All true hybrids were sterile. In 4 cases false hybrids resembling the mother species were secured as well as true intermediate hybrids.—Chromosome counts of species showed that *lutea* had 48 chromosomes (haploid), other species 24. Cytological studies disclosed marked differences in behavior in maturation divisions. *Lutea-micrantha* (48 + 24 chromosomes) exhibited 36 conjugating pairs of chromosomes in diakinesis; *lanata-micrantha* (24 + 24) formed 24 pairs; *lanata-lutea* (24 + 48) showed a variable number of pairs of chromosomes, with formation of loose double series of chromosomes in the equatorial plate; *purpurea-lutea* (24 + 48) exhibited no conjugation in diakinesis; and *purpurea-ambigua* (24 + 24) formed 24 pairs of chromosomes. Multi-polar spindles were frequently observed and "Nebenkerne" were often formed from chromosomes not drawn back to the poles of the spindle. The 2nd maturation division was regular and occurred simultaneously in "Nebenkerne" and regular daughter nuclei. Degeneration of germ cells occurred at subsequent stages. A *gigas*-like *lanata-lutea* plant, "E," was found to have 48 large double chromosomes plus a variable number of pairs of smaller chromosomes.—The author rejects the hypothesis that sterility depends upon repulsion of specifically different chromosomes; for even in extreme cases where no pairing was demonstrable in diakinesis typical synapsis occurred and double threads appeared in the succeeding stage. He favors a physico-chemical interpretation dependent upon differences in ability of chromatin-building enzymes in hybrids to build up from nucleolar material chromatin necessary for formation of chromosomes of diakinesis. Chromosomes in diakinesis may in consequence be immature or unripe and not in proper physical condition for conjugation. In developing the hypothesis the author discusses particularly Federley's work on *Pygaera*, Rosenberg's on *Hieracium*, and Bailey's on *Triticum-Aegilops* hybrids. The cytological work on the false hybrids has not been completed but the author rejects the hypotheses of induced apogamy, parthenogenesis, or pseudogamy as explanations. He assumes that they result from fertilization and suggests that possibly relative ripeness of germ cells determines whether a true or false hybrid will be produced. In the *gigas*-like plant "E" of the *lanata-lutea* series, the 48 large double chromosomes are assumed to result from the stimulation of activity of *lutea* chromatin-building enzymes at the expense of *lanata* chromosomes, which remain small and variable in number. Stimulation leads to premature splitting of chromosomes and possibly to formation of germ cells with normal somatic number of chromosomes. In this connection the author discusses the general significance of *gigas* phenomena in plants.—R. E. Clausen.

2458. HAECKER, V. Die Annahme einer erblichen Übertragung körperlicher Kriegsschäden. [The supposition of a hereditary transmission of physical war injuries.] Arch. Frauenk. u. Eugenik. 4: 1-15. 1919.—The author reviews at length arguments for and against the inheritance of acquired characters, and concludes that biological evidence is against the possibility of inheritance of war injuries. So far as observed, the average weight and vitality of infants born in 1916 showed a favorable increase. If the effects of malnutrition, exhaustion, and psychic disturbances could lead to racial degeneration, then it is believed Germany could not have survived the devastations of the Thirty Years War. Even should such harmful effects supervene, and this is not proved, "observed facts as well as biological considerations point to an inherent power of regeneration of the germ-plasm." The basis of this is not known, but it may reside in the intercrossing of strains.—W. E. Key.

2459. HELLER, H. H. Mutations in the genus *Nicolaierillus* (*B. tetani*). VIII. Studies on pathogenic anaerobes. Jour. Infect. Diseases 30: 33-49. 6 fig. 1922.—Tetanus strains mutate readily in favorable protein media; the mutation of non-proteolytic anaerobes is much less frequent. This is found to be in accordance with the hypothesis that proteolytic anaerobes are the products of a more far-reaching evolution than the non-proteolytic forms. The importance of the mutations from the systematic, biochemical, and therapeutic points of view are discussed and technical suggestions made.—Selman A. Waksman.

2460. HELLER, H. H. Notes on the genus *Nicolaierillus* (*B. tetani*). VII. Studies on pathogenic anaerobes. Jour. Infect. Diseases 30: 18-32. 2 fig. 1922.—A study is made of the mutation of tetanus strains as shown by the colony formation.—Selman A. Waksman.

2461. HERWERDEN, M. A. VAN. [Dutch rev. of: GEROULD, JOHN H. *Blue-green caterpillars: The origin and ecology of a mutation in hemolymph color in Colias (Eurytus) Philodice*. Jour. Exp. Zool. 34: 385-415. 1 pl. 1921 (see Bot. Absts. 11, Entry 1348).] *Genetica* 4: 81-82. 1922.

2462. HUNT, R. E. *Selecting Holstein-Friesian sires for high yearly production*. Jour. Heredity 12: 368-384. Fig. 19-25. 1921.—A study is reported of the Holstein-Friesian herd of cattle with the object of discovering the high-producing lines. All sires of cows with a record of 600 pounds of butterfat in a year are listed and classified according to the records of their daughters.—*Sewall Wright*.

2463. HUXLEY, JULIAN S. *Some implications of the chromosome theory of heredity*. Sci. Prog. 16: 235-250. 1921.—This is a statement of the present status of the chromosome theory of heredity, together with some of its obvious implications for the general problem of evolution on the one hand and of differentiation on the other. The facts of Mendelian inheritance are first given and it is stated as a working hypothesis "that the hereditary constitution of an organism consists of a large number of genes, Mendelian unit factors." The evidence that the chromosomes are the bearers of the genes is then briefly reviewed, and it is indicated that the differentiation of the ovum both before and after fertilization may be thought of as under the influence of these chromosomal units. These "factors of heredity. . . . constitute a mechanism which has two distinct functions. . . . The first function is to act as the self-regulating machinery of heredity; the second, in conjunction with sexual reproduction, is to allow the multiplication and more especially the recombination of variations, so as to afford the possibility of evolutionary change." The question of the mutation of single genes is discussed, and it is suggested that "it is by the combination of many small (but definite and discontinuous) constitutional changes that evolution proceeds." The presence and absence is being abandoned in favor of the view that mutation is a change in a gene, and the independence of the genes in heredity permits of all possible recombinations. Selection has thus plenty of material on which to work in establishing new species. Much evidence is quoted in support of this view, most of which is explainable only on Mendelian grounds. It is indicated that "Mendelian recombination produces extreme variations rarely, but a vast number of combinations which exhibit but a few differences from the average." From another point of view, however, it appears that apart from possible mutations the gene-constitution is a unit-complex which, being self-perpetuating, is "adapted for the task of acting as the self-regulator of heredity; for passing on unchanged from generation to generation that constitution which in interaction with environment gives the adult organism; and therefore for *resisting* the very type of effect which the Lamarckians consider to be operative in evolution."—The other essential side of heredity, that of the differentiation of the adult organism from the fertilized egg, has been considered to be impossible of explanation on the basis of the chromosome theory since all cells receive the full gene-complex. Given, however, the initial polarity and pre-localization of substance in the egg (which seems to be produced by interaction of gene-complex with cytoplasm), then, when the egg divides, the same gene-complex will be located in different environmental regions and will give different end-products. A formal explanation of differentiation thus becomes possible. "The development of an organism is a series of states of equilibrium usually of increasing complexity, none fully balanced, but each resolving itself automatically into the next. Finally the adult stage is reached, in which relative stability is assured, either by the narrow limits of the environment or by elaborate regulatory mechanisms." The chromosome theory in its present state is based on experimental evidence. While it may require correction "it is the only hypothesis which allows us to synthesize so many distinct sets of facts in one conception."—*H. H. Plough*.

2464. JEFFREY, E. C. *The geographical distribution of hybrids*. Science 54: 517. 1921.—The author criticizes Fernald and supports Kerner's view that natural hybrids may occur beyond the geographic range of one or both parents.—*Merle C. Coulter*.

2465. JONES, D. F. Collins's remarks on the vigor of first-generation hybrids. *Amer. Nat.* 55: 457-461. 1921.—Jones's explanation of heterosis on the basis of dominance of linked factors recently received the following comments from Collins [see *Bot. Absts.* 8, Entry 1903]: (1) With many factors involved, skew curve of theoretical distribution (in F_2) of independent dominant factors (governing heterosis) approaches type of normal curve; linkage assumption being unnecessary. (2) With many independent factors involved, the possibility of recombining all in a single individual (homozygous for maximum hybrid vigor) is so remote that non-appearance of such individuals in experimental work is no proof that they cannot be obtained; linkage assumption again is unnecessary. (3) Heterosis should be regarded as due to suppression of deleterious recessives rather than combination of favorable dominants.—Jones now replies as follows: (1) Where the range of segregating generations with small numbers nearly equals the combined range of the original races as exhibited by characters which show heterosis, the number of main factors governing expression of heterosis cannot be large. Assuming dominance without linkage, such distributions should show right-hand skewness, which they never do. (2) Experimental work may have been inadequate in magnitude to disprove possibility of recombining all desirable growth factors in 1 homozygous individual (assuming no linkage), but other evidence is available. Natural selection in isolated populations of cultivated plants has not brought about noticeable stability. Corn varieties, probably grown 50 years without admixture, when selfed show as rapid reduction in vigor as other varieties which are recent products of hybridization. (3) Suppression of deleterious factors is inadequate to account for heterosis when other forms than *Zea* and *Drosophila* are considered. Many cases are known where crossing parents, both "normal, vigorous, and perfectly capable of maintaining themselves," has yielded markedly superior F_1 hybrids. The author emphasizes the practical importance of realizing that the act of inbreeding does not produce weakened individuals but is merely a sorting out process. "These less vigorous individuals of no apparent value have potentially great value."—*Merle C. Coulter*.

2466. KINDRED, JAMES ERNEST. Inheritance of a pit in the skin of the left ear. *Jour. Heredity* 12: 366-367. *Fig. 17-18*. 1921.—A small pit "in the skin of the proximal end" of the upper part of the left ear is shown to have been inherited through at least 4 generations by individuals of both sexes. As the pit is transmitted by individuals not possessing it, and conversely it is termed a case of incomplete dominance.—*Oliver Olson*.

2467. KNIEP, H. [German rev. of: BLAKESLEE, ALBERT F., J. LINCOLN CARTLEDGE, AND DONALD S. WELCH. Sexual dimorphism in *Cunninghamella*. *Bot. Gaz.* 72: 185-219. 1 fig. 1921.] *Zeitschr. Bot.* 14: 326-327. 1922.

2468. KNIEP, H. [German rev. of: MEISENHEIMER, J. *Geschlecht und Geschlechter im Tierreiche. I. Die natürlichen Beziehungen.* (Sex and the sexes in the animal kingdom. I. The natural relations.) xiv + 896 p., 737 fig. Gustav Fischer: Jena, 1921.] *Zeitschr. Bot.* 14: 299-300. 1922.

2469. KNIGHT, M. M., IVA L. PETERS, AND PHYLLIS BLANCHARD. *Taboo and genetics.* 301 p. Moffat, Yard and Co.: New York, 1920. Part I. The new biology and the sex problem in society. Sex is defined in terms of internal secretions and evidence for dual basis of sex drawn from free martin cattle and partial reversal of sex in human species. Sex differences are quantitative and conditioned on the effect of the 2 diverse chemical systems on the life cycle. Most significant differences from the standpoint of group survival are: (1) less active and more uneven metabolism in woman, (2) less physical strength and inferior adaptability to some kinds of work; and (3) specialization of the female body and metabolism to furnish intramaternaternal environment and lactation for young. The problem of human reproduction and group survival thus becomes a problem of group adjustment to environment which this specialization entails.—Part II. The institutionalized sex taboo. The primitive social control necessary to survival was exercised largely through taboo. One form, the institutionalized sex taboo, co-extensive with human society, exists today at the base of family life—the socialized form

of sex relationship. In early ages, fear of contamination by woman was the essential element of this taboo. Later, emphasis was placed on her mystic and uncanny power. Through further transformations in the early Christian period, the 2 extremes in attitude are arrived at which regard woman as unclean and in league with demons, culminating in witchcraft persecutions, and the conception of her as an ideally pure being who must remain chaste until her marriage. These taboo survivals act today, dysgenically, by leaving girls in ignorance of fundamental life processes and unprepared for the actualities of wifehood and motherhood. Prostitution, with its attendant evils, is an indirect effect of the struggle between man's instinctive needs and his mystical conception of woman. Such taboos subject marriage and motherhood to penalties which the trained and educated woman refuses to pay. This again results in a loss of eugenic motherhood.—Part III. The sex problem in the light of modern psychology. Taboo control compels conformity to arbitrary standards of masculinity and femininity, and in the ensuing conflict the emotions seek other channels of activity. Such impulses may reach out to envelop all mankind, find an outlet in religious feeling or stop at erotic fancy and day dreaming. Becoming habitual, they interfere with a return to natural activities with resultant genetic loss. Homosexual fixations established in college or among those engaged in similar lines of work also hinder the marriage of large numbers of able women. Choice of a mate is determined by irrational impulses which lie far below the levels of consciousness, and far outweigh eugenic considerations. Society being more interested in the manner of expression of the love life of the individual has permitted dysgenic influences to continue in the psychic life generation after generation. Most potent of these is the conflict between group regulations and interests of the individual. Cramping effect of marriage lessens its attractions for the ambitious man or woman; the most vital and aggressive stock fail to reproduce with consequent loss to the social organism in the intergroup struggle. Our aim should be a type of social organization where the production of eugenic offspring would bring the same approval and reward as is now accorded egoistic activities. The greatest triumph of society in the manipulation of the sexual and reproductive life will come when it is able to condition the emotional reaction of the individual by the substitution of the eugenic ideal for the parental fixation and to focus the sentiment of romantic love upon eugenic traits. The responses to be broken down are for the most part formed in early childhood and have thus become firmly impressed on the organism; but psychological experiments have proved that even the best established conditioned reactions can be broken down and others substituted so that the situation is not hopeless. A step in the right direction has already been taken through the increasing freedom of women and the constant association of the sexes in the educational and business world. The new ideal of love which is being developed combines complete understanding and frankness with erotic attraction and the tenderness of romanticism. It implies a type of marital relationship in which there is preservation of the personality with a harmony of interests absent from the old-fashioned marriage. A solution of the conflict between individual and group interests, then, calls for a more rational form of social control freed from the long ages of taboo restriction, and based upon accurate biological and psychological knowledge. Such rationalization will take into account the value of the new ideal of love, grant a greater degree of personal autonomy in sexual relationships in so far as this can be correlated with the welfare of the children, and attempt to condition the emotional reactions to respond to stimuli which shall insure eugenic mating naturally and without the intervention of legislation.—*W. E. Key.*

2470. LANCEFIELD, REBECCA C., AND CHARLES W. METZ. **Non-disjunction and the chromosome relationships of *Drosophila Willistoni*.** Proc. Nation. Acad. Sci. [U. S. A.] 7: 225-229. 10 fig. 1921.—Genetic and cytological evidence is given for the occurrence of non-disjunction of the sex chromosomes in *Drosophila Willistoni* Sturt. The genetic evidence is in all respects like that given by Bridges for the same phenomenon in *D. melanogaster*, and similar classes of exceptional flies are found. The most interesting point established by the cytological evidence is that the pair of sex-chromosomes in *D. Willistoni* is not the same pair shown by Bridges to be the sex chromosomes in *D. melanogaster*. They are one of the long V-shaped pairs instead of the shorter rod-like pair. This indicates that either the chromosome resemblances

are superficial or that the sex-determining elements (genes) have been transferred from one chromosome to another. The actual sex-linked characters observed in *D. Willistoni* are very different from any in *D. melanogaster*.—H. H. Plough.

2471. LAUGHLIN, HARRY H. *Eugenics in Germany*. *Eugenics Rev.* 12: 304-307. 1921.—Modern civilization is a blend between Germanic blood and classical culture. Inhabiting the regions which surround the Baltic Sea, the Germanic stock has, by successive migrations, infused fresh life into decadent states and assumed leadership in several nationalities. For several decades prior to the Great War, these migrations had virtually ceased. The result was over-population in Germany. An ambitious military government inveigled the people into the belief that the future service of Germany lay not in the rejuvenation of decadent stocks through the infiltration of her blood, but through conquest to become the chief teacher and assimilator of the nations.—The project failed but in the new Constitution many provisions which insure continuing racial vigor are incorporated. Chief among these are the following: The general national government has the exclusive legislative authority over "right of changing residence, immigration and emigration and extradition."—The general government is to exercise the right of legislation over criminal law, poor laws, and vagrancy; population policy; provisions affecting maternity, nurslings, young children and adolescents; national health, veterinaries, protection of plants from disease and pests; labor laws, insurance and protection of workmen and employes, and employment agencies. Marriage is stated to be the foundation of family life and the nation. As such it is placed under the particular protection of the Constitution and is based on the equal right of the sexes. Families with numerous children have a claim for compensating care.—Legal discriminations against women no longer exist. There are no orders of nobility, but the aristocracy of natural ability is recognized in article 128, which admits all citizens "to public office according to the provisions of the law and their abilities." Special provision is made for conserving the health of the nation and especially for the protection of motherhood in the stress of modern industrial life. In admitting all citizens of the State to public office and making liberal provision for the nurture of all children irrespective of parentage, Germany recognizes principles fundamental in a democratic form of government which, it is stated, other nations would do well to emulate.—W. E. Key.

2472. LEHMANN, E. [German rev. of: BAUR, E. *Die wissenschaftlichen Grundlagen der Pflanzenzüchtung; ein Lehrbuch für Landwirte, Gärtner und Forstleute*. (The scientific principles of plant breeding; a text-book for farmers, gardeners, and foresters.) 115 p. Gebrüder Borntraeger: Berlin, 1921.] *Zeitschr. Bot.* 14: 300-301. 1922.

2473. LEHMANN, E. [German rev. of: RASMUSON, HANS. *Beiträge zu einer genetischen Analyse zweier Godetia-Arten und ihrer Bastarde*. (Contribution to a genetical analysis of two species of *Godetia* and their hybrids.) *Hereditas* 2: 143-289. 1 pl., 29 fig. 1921 (see *Bot. Absts.* 9, Entry 1366).] *Genetica* 4: 303-305. 1922.

2474. LOTSY, J. P. [Dutch rev. of: GOULD, CHARLES W. *America a family matter*. 181 p. Charles Scribner's Sons: New York, 1920.] *Genetica* 4: 82-87. 1922.

2475. McCANDLISH, A. C., AND L. M. WINTERS. *A study in bulls*. *Jour. Dairy Sci.* 3: 529-539. 1920.—A résumé is given of work already done to determine the value of pure-bred bulls by comparing the records of daughters with those of dams. In the present investigation bulls of various breeds were used. Variation in ability to transmit producing capacity to daughters is not a breed characteristic. If dams have as high or higher potentialities of production than sires, it is very difficult to judge the merits of the sires. Similarity in breeding is not an indication of similarity in producing ability or in transmission of this ability.—E. Roberts.

2476. McCLUNG, C. E. [Rev. of: SHARP, LESTER W. *An introduction to cytology*. 15 × 23 cm., vii + 452 p., 159 fig. McGraw-Hill Book Co.: New York, 1921.] *Science* 55: 482. 1922.

2477. MATTFELD. [German rev. of: ALMQUIST, ERNST. Studien über *Capsella bursa-pastoris* (L). II. [Studies on *Capsella bursa-pastoris* (L).] Acta Hort. Bergiani 7: 41-95. 16 fig. 1921 (see Bot. Absts. 8, Entry 208).] Bot. Jahrb. 57: 17. 1922.

2478. NACHTSHEIM. [German rev. of: FEDERLEY, HARRY. Beiträge zur Kenntnis der Säugetiergametogenese. I. Die Spermatogenese von *Mus silvaticus* L. (Contribution to the knowledge of mammalian gametogenesis. I. The spermatogenesis of *Mus silvaticus*.) Acta Soc. Sci. Fennicae 48: 5-37. 1 pl. 1919.] Arch. Zellf. 16: 297-298. 1922.

2479. NACHTSHEIM. [German rev. of: FOOT, KATHERINE. Preliminary note on the spermatogenesis of *Pediculus vestimenti*. Biol. Bull. 37: 371-384. 2 pl. 1919.] Arch. Zellf. 16: 296-297. 1922.

2480. NACHTSHEIM. [German rev. of: HARMAN, MARY T. Chromosome studies in Tettigidae. II. Chromosomes of *Paratettix* BB and CC and their hybrid BC. Biol. Bull. 38: 213-230. 3 pl. 1920 (see Bot. Absts. 7, Entry 1763).] Arch. Zellf. 16: 294-295. 1922.

2481. NACHTSHEIM. [German rev. of: SCHRADER, FRANZ. Sex determination in the white-fly (*Trialeurodes vaporariorum*). Jour. Morphol. 34: 267-305. 4 pl. 1920 (see Bot. Absts. 7, Entry 239).] Arch. Zellf. 16: 295. 1922.

2482. NACHTSHEIM. [German rev. of: SHAFFER, E. L. A comparative study of the chromosomes of *Lachnosterna* (Coleoptera). Biol. Bull. 38: 83-103. 1920 (see Bot. Absts. 8, Entry 1119).] Arch. Zellf. 16: 293. 1922.

2483. NACHTSHEIM. [German rev. of: SMITH, BERTRAM G. The individuality of the germ-nuclei during the cleavage of the egg of *Cryptobranchus alleganiensis*. Biol. Bull. 37: 246-286. 9 pl. 1919 (see Bot. Absts. 4, Entry 771).] Arch. Zellf. 16: 291. 1922.

2484. NILSSON, N. HERIBERT. [German rev. of: LUNDBORG, H. En svensk bondesläkts historia sedd i rasbiologisk belysning. Svenska Sällskapets för Rashygien skriftserie II. (The history of a Swedish peasant family in eugenical light. Papers of the Swedish eugenical association II.) 14 × 21 cm., 40 p., 8 fig. P. A. Norstedt & Soners Förlag: Stockholm, 1920 (see Bot. Absts. 5, Entry 414).] Arch. Rass.- u. Ges. Biol. 14: 73-75. 1922.

2485. P., J. H. [Rev. of: HAYES, HERBERT KENDALL, AND RALPH JOHN GARBER. Breeding crop plants. 15 × 23 cm., 328 p., 66 fig. McGraw-Hill Book Co., Inc.: New York, 1921 (see Bot. Absts. 10, Entry 944).] Jour. Amer. Soc. Agron. 14: 53-55. 1922.

2486. P[OPENOE], P[AUL]. [Rev. of: LONG, H. W. Motherhood. 195 p. Richard G. Badger: Boston, 1921.] Jour. Heredity 12: 401. 1921.

2487. SEILER, J. [German rev. of: GOLDSCHMIDT, R. Die quantitative Grundlage von Vererbung und Artbildung. (The quantitative basis of heredity and species formation.) 163 p., 28 fig. Julius Springer: Berlin, 1920.] Arch. Zellf. 16: 287. 1922.

2488. SETCHELL, WILLIAM ALBERT, THOMAS HARPER GOODSPEED, AND ROY ELWOOD CLAUSEN. Inheritance in *Nicotiana Tabacum*. I. A report on the results of crossing certain varieties. Univ. California Publ. Bot. 5: 457-582. Pl. 55-85, 2 fig. 1922.—This is the 1st of a series of reports on the results of intercrossing certain varieties of *Nicotiana Tabacum*. The work, begun in 1909, to test Comes's hypothesis of the origin of the numerous cultivated forms belonging to the *Tabacum* group, has been broadened until at least 4 distinct but inter-related series of problems are being studied. The report presented here concerns itself with a detailed study of Mendelian differences among a typical set of *N. Tabacum* varieties.—Three sets of cultures are described in the present article; the *angustifolia-macrophylla* reciprocal

crosses; the *calycina-virginica* reciprocal crosses; and the *alba-macrophylla* reciprocal crosses. The results are summarized by the authors as follows: (1) All differences between varieties of *Tabacum* can be analyzed in a Mendelian fashion, if sufficient refinement in methods be introduced. (2) Stable recombinations of parental characters can readily be obtained with 3-4 generations of self-fertilization. (3) Characters outside the range between the parents are sometimes produced following hybridization, and these may be readily established in stable lines by self-fertilization. (4) The petioled leaf base of *angustifolia* and the sessile leaf base of *macrophylla* differ in at least 3 pairs of factors. (5) A single factor difference exists between normal and split hose-in-hose flowers. (6) Two pairs of factors account for the relation existing between red, light pink, and white flower color. A 3rd pair of factors is necessary to account for dark red.—On the theoretical side it is pointed out that: (1) Derivation of relationships and erection of systems of classification after the manner of Comes and Anastasia cannot be relied upon unless supported by experimental evidence. (2) An adequate scheme of classification should be based upon identities and dissimilarities in the genotypes, irrespective of the derivation of the forms in question. (3) Mendelian analysis in *Tabacum* requires that special attention be paid to residual portions of the genotype, so that the factor differences under consideration act in a stable residuum most favorable for emphasis of the character differences under investigation.—*W. A. Setchell.*

2489. SIEMENS. [German rev. of: BAUER, J. *Die konstitutionelle Disposition zu inneren Krankheiten.* (The constitutional disposition to internal diseases.) xi + 650 p., 63 fig. Julius Springer: Berlin, 1921.] Arch. Rass.- u. Ges. Biol. 14: 79-81. 1921.

2490. SIEMENS. [German rev. of: SCHALLMAYER, W. *Vererbung und Auslese. Grundriss der Gesellschaftsbiologie und der Lehre vom Rassedienst.* (Heredity and selection. Fundamentals of social biology and the doctrine of service to the race.) 3rd ed., 8 vo., xvi + 536 p. Gustav Fischer: Jena, 1918 (see Bot. Absts. 2, Entry 704).] Arch. Rass.- u. Ges. Biol. 14: 75-77. 1922.

2491. STARK, PETER. [German rev. of: (1) SALISBURY, E. J. *Variation in Eranthis hyemalis, Ficaria verna, and other members of the Ranunculaceae, with special reference to trimery and the origin of the perianth.* Ann. Botany 33: 47-79. 20 fig. 1919 (see Bot. Absts. 2, Entry 703). (2) IDEM. *Variation in Anemone apennina L., and Clematis vitalba L., with special reference to trimery and abortion.* Ann. Botany 34: 107-116. 9 fig. 1920 (see Bot. Absts. 5, Entry 1625).] Zeitschr. Bot. 14: 259-261. 1922.

2492. STEWART, G. *Potato improvement by hill selection.* Utah Agric. Exp. Sta. Bull. 176. 28 p., 14 fig. 1920.—A report is presented of 9 years of hill-unit selection preceded by 3 years of variety test. Practically all the selection work was done with a blue-sprout variety, the Majestic. Strains isolated by selection were compared with each other and with unselected stock of the original variety. Such a comparison for 6 years of the best pedigree selection showed an average increase in yield of 60.9 per cent and an increase of 24.4 per cent in average size of tuber. Biometrical data for weight of hill for a number of strains are given. Some selections were made on the basis of foliage characteristics, and 2 chlorotic strains were isolated.—*C. H. Myers.*

2493. STURTEVANT, A. H. *A case of rearrangement of genes in Drosophila.* Proc. Nation. Acad. Sci. [U. S. A.] 7: 235-237. 1921.—In *Drosophila simulans* it has been shown that 5 mutant genes in the X-chromosome are allelomorphic to, and lie in the same sequence in the chromosome as, 5 similar genes in *D. melanogaster*. Study of the situation in the 3rd chromosome of *D. simulans* discloses the interesting fact that identical loci in this group do not lie in the same sequence as in *D. melanogaster*. In the latter species scarlet is 3 units from peach and delta 19 units further on. In *D. simulans* scarlet is 25 units from deltoid and peach 36 units beyond. Several methods of accounting for this result are suggested. The demonstration indicates that identical loci in related species are not necessarily carried in the same order in the chromosome.—*H. H. Plough.*

2494. STURTEVANT, A. H. Linkage variation and chromosome maps. Proc. Nation. Acad. Sci. [U. S. A.] 7: 181-183. 1921.—Citations are given which show that Detlefsen's conclusion [see Bot. Absts. 9, Entry 742], that crossing over is not necessarily proportional to the distance between the genes of the chromosomes, has been the accepted idea of the *Drosophila* workers as long as they have been constructing chromosome maps, and that therefore Detlefsen's criticism is based on a misconception.—H. H. Plough.

2495. STURTEVANT, A. H. The North American species of *Drosophila*. Carnegie Inst. Washington Publ. 301. iv + 150 p., 3 pl. 1921.—Seven of the 15 sections are of genetical interest. (1) Behavior. Males of *D. melanogaster* will copulate with females of at least 3 other species, but are fertile only with *D. simulans*; the reciprocal of the latter mating is also fertile. Males of *D. melanogaster* without sex combs mate as readily as normal males; a male with wings is able to excite a female sexually more quickly than one with wings removed; neither sex chooses normal in preference to mutant types for mating. "All attempts to induce courtship by means of visual or olfactory stimuli alone have failed in *Drosophila*." It is thought that visual and tactile stimuli are probably involved in producing courtship. (2) Genetics. A brief account is presented of the general results of breeding work with *D. melanogaster*. Data from 12 other species are also considered; so far as known these have similar genetical behavior. There is "* * * convincing evidence * * * that in some cases the same identical mutation has occurred in different species." (3) Chromosomes. Present knowledge of *Drosophila* chromosome groups is discussed. (4) Intraspecific variability. Very few inherited variations are found persisting in nature; the range of non-inherited variations is not great. Secondary sexual characters are relatively inconspicuous; a list is given of those observed. (5) Geographical distribution. A list is given for each of the main geographical regions. (6) Species hybrids. *D. simulans* ♀ × *D. melanogaster* ♂ gives hybrid ♂♂, very few hybrid ♀♀; the reciprocal gives hybrid ♀♀ only. Hybrids are all sterile, and are intermediate in appearance between the parents. Non-disjunctional data, etc., are also considered. Cytoplasm, as well as chromosomes, is involved in determining the viability of the hybrid. Data indicate that the 2 species differ in a number of genes. Some genes are identical and subject to identical mutations in the 2 species; the linear order is also the same. (7) Specific vs. mutational differences. "Species, then, differ from each other in many genes. The differences though numerous are such that each produces only a slight effect on the organism. These differences are of the same kind as are the mutational differences, and may be supposed to have arisen by mutation." Specific cases of parallelism between mutant characters and characters of wild species are given.—C. W. Metz.

2496. SUEMATSU, N. On the resistant varieties. Ann. Phytopath. Soc. Japan. 14: 53-56. 1921.—[Text mostly in Japanese.] A review is presented of papers dealing with the breeding of disease-resistant varieties of plants and some discussion of them. No original matter is reported.—Takewo Hemmi.

2497. UBISCH, G. VON. Abweichungen vom mechanischen Geschlechtsverhältnis bei *Melandrium dioicum*. [Deviations from the mechanical sex ratio in *Melandrium dioicum*.] Biol. Zentralbl. 42: 112-118. 1922.—The author discusses the results of G. H. Shull's experiments on *Lychnis (Melandrium) dioica* with respect to sex-linked inheritance of a factor for broad vs. narrow leaves, and on the basis of Corren's demonstration that the male-producing pollen-tubes germinate more slowly or grow more slowly through the style, decides that Shull's formulation needs modification. The author concludes that pollen grains characterized by the coupled factors *B* (= broad leaf) and *F* (= femaleness) are somewhat speedier in reaching their goal than those possessing the combination *fb* and the latter considerably speedier than *Fb*. In the eggs the *Fb* combination is also assumed to be slightly injurious. To account for certain unexpected results, the author assumes that the broad-leaf factor is not completely coupled with sex, but that occasional crossing over takes place. He considers the alternative hypothesis that sex potency or "valence" becomes modified so that a constitution which would have ordinarily produced a female, now produces a male, and *vice versa*,

to be untenable because of the rarity of occurrence of hermaphrodites (intersexes).—*Geo. H. Skull.*

2498. VOGT, A. Der Altersstar, seine Heredität und seine Stellung nach exogener Krankheit und Senium. [Senile cataract, its heredity and its place in exogenous disease and senile degeneration.] *Zeitschr. Augenheilk.* 40: 123-137. 1918.—The wide range in the life span of different plants and animals is well known. A range within smaller limits is found in human strains, and, with reference to individuals, different organs show senility at different periods. These individual variations are also found in different tissue elements of the organ and in different portions of the same tissue. The author differentiates between acute forms of senile cataract and the tendency toward the same as evidenced by clouding of the lens at the periphery (coronary cataract). The latter is found to be hereditary. He suggests a connection with myotonic dystrophy which has been related to abnormalities of the internal secretions. Conclusions are based on the following cases: A woman with an advanced case of coronary cataract has 5 grown children of whom 4 are affected. In other families, father or mother and daughter, 2 and 3 members of fraternity are similarly affected. In one network of 41, covering 2 generations, 19 were examined, of whom 15 were affected.—*W. E. Key.*

2499. W., D. D. Effect of selection of "seed" on the yield of the potato crop. *Jour. Dept. Agric. Ireland* 21: 412-414. 1921.—Tubers from high-yielding stalks of several varieties produced higher-yielding plants than tubers "of corresponding size" selected at random, although both produced apparently disease-free plants.—*Donald Folsom.*

2500. WILLIER, B. H. Structures and homologies of freemartin gonads. *Jour. Exp. Zool.* 33: 63-127. 18 fig. 1921.—In the freemartin (heifer calf twinned with bull) the relatively undifferentiated gonad, primarily of female character, is modified toward a masculine type by the influence of hormones from the anastomosed male circulation. There are 3 grades of modification recognized, which represent progressive steps toward maleness, and in a fashion are connecting links between the embryonic ovary and the embryonic testis. These grades are based on: (a) seriated gradations between the medullary cords and the seminiferous tubules displayed by the sexual cords; (b) an increase in the number of interstitial cells as the gonad increases in degree of maleness; (c) developing connections (tubuli recti) between the rete tubules and the seminiferous tubules as well as the rete tubules and the epididymal tubules in proportion to the degree of transformation away from the female gonad; (d) increasing development of the epididymis from absence in a low degree of transformation to typical presence in a high degree of transformation; and (e) rearrangement of the blood vessels from the typical ovarian pattern toward the typical male pattern. The limit of transformation in the male direction is represented by a morphologically complete testis from the standpoint of sperm formation functionally inactive. A graded series of transformations between the ovary and testis exists dependent on: (a) time of introduction of the male hormones; (b) the potency of the male hormones; (c) the duration of their action; (d) the absence of normal ovarian hormones; and (e) the absence of interstitial cell secretions in freemartin gonads. Other genital organs are changed correlatively with the gonad (uterus, external genitalia, vas deferens, and seminal vesicle). Some lateral differentiation may exist dependent on the degree of change on one side being greater than on the other. In the freemartin gonads, the interstitial cells are either absent or functionless, bearing no relation to sex instincts or to secondary sex characters. Apparently the mammalian ovary possesses morphological structures homologous or at least equivalent to those of the testis, as demonstrated by the ease of transformation of the ovary into the testis in the freemartin.—*Edward N. Weniworth.*

HORTICULTURE

J. H. GOURLEY, *Editor*H. E. KNOWLTON, *Assistant Editor*

(See also in this issue Entries 2120, 2128, 2151, 2240, 2350, 2392, 2412, 2445, 2631, 2891, 2893, 2944, 2946, 2947, 2962, 2972, 3065, 3098, 3103, 3155, 3194, 3202, 3203, 3248)

FRUITS AND GENERAL HORTICULTURE

2501. ANONYMOUS. When to do what you want to do. The month's reminder (Dec.). Gard. Mag. 34: 176-177. 1921.—The article discusses things to be done in December in caring for fruit plants, vegetables, and flowers, including both outdoor and inside work with crops which are forced.—*H. C. Thompson.*

2502. ALLEN, W. J., and W. LE GAY BRERETON. New standard numerical pack for apples. Agric. Gaz. New South Wales 33: 120-122. 2 fig. 1922.—The container is the modified Canadian apple case with a capacity of an Imperial bushel. The new pack is characterized by edge packing instead of flat packing, the former being considered more suitable to apples. A table for the 3-2 pack for 4 tiers and 3-3 pack for 5 tiers, is given, the number of apples running from 100 to 195 per box. Certain of the packing runs are to be further tested.—*L. R. Waldron.*

2503. BARCLAY, JOHN H. Commercial apple growing in New Jersey. Bull. Delaware State Bd. Agric. 10: 20-29. 1921.—The author reports on varieties grown and cultural and spraying practices common in New Jersey.—*T. F. Manns.*

2504. BATCHELOR, L. D. Winter injury to young walnut trees during 1921-22. California Agric. Exp. Sta. Circ. 234. 5 p. 1922.—Early fall frosts are a common cause of injury to young trees, which are more likely to suffer from them than mature bearing trees, because the latter become dormant earlier in the season. Walnut foliage which is still green is apparently as subject to frost injury as tender vegetables. The frosted foliage drops prematurely, exposing the immature twigs to the sun and causing excessive moisture loss and eventually death. Frost injury may be prevented if it is possible to mature the young walnut trees early, so that the leaves will turn yellow and fall normally before the early frosts. Early maturity can be promoted by withholding irrigation water in the late summer and early fall.—*A. R. C. Haas.*

2505. BECKWITH, C. S. Cranberry spraying apparatus. Amer. Cranberry Growers' Assoc. Proc. Ann. Convention 52: [7-12.] 1921.—Tests of high-powered spraying apparatus with solid stream nozzles are reported. Injury to vines from tramping and dragging the hose has occurred. With a pressure of 300 pounds 8 men sprayed 20 acres in 4 hours and 10 minutes, using 200 gallons per acre. Ninety-five per cent of the vines had a heavy, even coating of the mixture. The use of the solid stream sprayer in New Jersey will be limited, as not more than 5 growers spray 300 acres. This machine as last experimented with sprays about 60 acres in 8 hours. A grower is safe in planning to take as much as 8 days for 1 complete spraying.—*J. K. Shaw.*

2506. BECKWITH, CHARLES S. Report of cranberry sub-station for 1921. Amer. Cranberry Grower's Assoc. Proc. Ann. Meeting 52: 9-16. 1921.—The year's results indicate that for Savannah bottoms nitrate of soda is superior to dried blood as a nitrogen carrier and that 30 pounds of nitrogen give larger yields than 20 pounds. Yields for 3 successive years are given. Comparison of acid phosphate and phosphate rock showed larger gains from the former. The larger the amount of phosphoric acid up to 80 pounds the larger the yields. For poor Savannah soil 800 pounds of a mixture of 75 pounds nitrate of soda, 75 of dried blood, 200 of rock phosphate, and 50 of sulphate of potash gave better results than larger or smaller amounts.

Results of 2 years' experiments on a muck bottom are not extensive enough to give an accurate formula for a suitable mixture. Lime applications have given increases quite regularly after the 2nd year on Savannah bottoms and after the 3rd on muck bottoms. Flooding experiments early in August to control the cranberry girdler showed less damage to the crop by shallow flowing on clear days than by deep flowing on cloudy days. Flooding for 3 days early in August controlled the girdler and also prevented much of the year's feeding.—*J. K. Shaw.*

2507. BECKWITH, C. S. The effect of fertilizer treatments on Savannah cranberry land. *Soil Sci.* 12: 183-196. 1921.—Field experiments on Savannah cranberry land show that the most profitable nitrogen fertilizer is sodium nitrate and dried blood. Ammonium sulphate was unsatisfactory and calcium cyanamid of doubtful value. Acid phosphate and rock phosphate were efficient sources of phosphorus. Potassium sulphate and potassium chloride were good sources of potash. Cranberry bogs were found deficient in phosphorus, as high as 80 pounds of phosphoric acid per acre producing large increases in the crop. Sodium nitrate to give 20 pounds of nitrogen gave excellent returns, and a complete fertilizer of 500-800 pounds per acre gave good results. Over-fertilization causes excessive vine growth and soft berries and induces insect attack.—*W. J. Robbins.*

2508. BLIN, HENRI. Comment hiverner les plantes d'agrément. [How to winter plants successfully.] *La Nature* 1922: Suppl. 15-16. 1922.—Directions are given for wintering various plants, of which lists are included. The following groups are discussed: window plants; plants of cool, temperate, and warm greenhouses; and bulbous and tuberous plants.—*J. R. Schramm.*

2509. BLOKZEIJL, K. R. F. Java coco industry. *Pharm. Era* 54: 276. 1921.—The author gives an account of the introduction of coco cultivation into Java, the extent of the plantations, regions favorable for its cultivation, methods of harvesting and marketing, and the exports from 1916 to 1920. He also compares Java with Peruvian coco for cocain production.—*C. M. Sterling.*

2510. BRITTON, W. E. First report of the tree protection examining board. Connecticut [New Haven] *Agric. Exp. Sta. Bull.* 231. 339-350. 1921.—The text of the Connecticut law effective July 1, 1919, creating a tree protection examining board is given together with a set of questions once used in examining applicants for the business of protecting trees. A program is given of the institute held for the instruction of prospective and active tree protectors. A short list of publications relating to the care of trees is included.—*Henry Dorsey.*

2511. BROWN, A. N. Handling a thousand acre orchard. *Bull. Delaware State Bd. Agric.* 10³: 29-36. 1921.—As manager of 1,400 acres in several orchards, the author summarizes the handling of labor, equipment, spraying, fertilizing, cultivation, cover crops, and marketing.—*T. F. Manns.*

2512. C., A. [Rev. of: LECOMTE, H. Une Juglandacée du genre *Carya* en Indochine. (A Juglandaceous plant of the genus *Carya* in Indo-China.) *Bull. Mus. Hist. Nat. [Paris]* 1921: 437-440. *Pl. 1.* 1921.] *Rev. Bot. Appl.* 1: 233. 1921.

2513. CALVINO, MARIO. Ensayos de abonos sobre "Fresa." [Experiments with fertilizers on strawberries.] *Rev. Agric. Com. y Trab. [Cuba]* 4: 586-587. 1921.—Varieties used were: Missionary, Aroma, and Lady Corneille. Three plots of 1 hectare each were laid out for each variety, 1 plot in each set being left as a check. Net gains varying from 3,824 to 7,708 per hectare were obtained. The tests indicate the value of organic material in the dry red soil in which the berries were grown. Well-rotted manure, besides being rich in nitrogen, potash, anhydrous phosphorus, and lime, profoundly modifies the physico-chemical properties of these soils, maintaining them more humid. Calcium carbonate is useful and ammonium phosphate a good fertilizer. It is advised that previous to planting, well-rotted manure and

calcium carbonate be used, and the ammonium phosphate added at planting time or shortly after.—*G. R. Hoerner.*

2514. CHEVALIER, AUG. *Histoire et amélioration des pommiers, et spécialement des pommiers à cidre.* [History of the apple and its improvement, especially of cider apples.] *Rev. Bot. Appl.* 1: 149-215. 1921.—The history of pomology in France is considered; then the species and varieties of the genus *Malus* are discussed from a geographical point of view. The writer next traces the origin of the principal groups of apples, describes the methods by which new varieties have been obtained in France, and discusses the usefulness of experimental orchards. In connection with investigations made in French Indo-China with certain native apples the question is raised as to whether the apple could not be grown in the tropics, provided suitable varieties are obtained. It is urged that further biological studies be made with the aim of improving present varieties and extending the areas where they may be grown.—*P. G. Russell.*

2515. CHEVALIER, AUG. *La culture des arbres fruitiers en Syrie et Cilicie.* [Cultivation of fruit trees in Syria and Cilicia.] *Rev. Bot. Appl.* 1: 129-148. 1921.—An official inquiry yielded much information concerning the present status of fruit growing in these countries, which is reported here. Notes on the local varieties, distribution, and cultural data are given for each fruit. The fruits included are: apricot (*Prunus armeniaca*), almond (*Amygdalus communis*), banana (*Musa paradisiaca sapientum*), Seville orange (*Citrus aurantium*), lemon (*Citrus limonia*), cherry (*Prunus cerasus*), chestnut (*Castanea sativa*), citron (*Citrus medica*), wild quince (*Cydonia oblonga*), date (*Phoenix dactylifera*), fig (*Ficus carica*), pomegranate (*Punica granatum*), kaki (*Diospyros Kaki*), mandarin (*Citrus nobilis deliciosa*), Loquat (*Eriobotrya japonica*), hazelnut (*Corylus avellana*), walnut (*Juglans regia*), sweet lime (*Citrus limetta*), orange (*Citrus sinensis*), peach (*Amygdalus persica*), pistache (*Pistacia vera*), pear (*Pyrus communis*), apple (*Malus sylvestris*), plum (*Prunus domestica*), and grape (*Vitis vinifera*).—*P. G. Russell.*

2516. COLLINS, H. C. *How vanilla is grown in Mexico.* *Pharm. Era* 55: 52. 1922.—The author gives a brief account of preparing the ground for a vanilla plantation, habits of the plants, methods of artificial pollination, harvesting, and curing the beans, and grading and preparing the product for export.—*C. M. Sterling.*

2517. DANIEL, L. *Grafting and evolution.* *Sci. Amer. Monthly* 4: 115-117. 8 fig. 1921. In the majority of cases successful results of grafting have been obtained only between species of the same class. De Candolle therefore considered successful grafting as a criterion of the relative parentage of groups and species and recommended it as a means of solving the question of classification. Experiments have proved that this criterion has not the importance attributed to it. The pear is easily grafted on the quince, but the quince can not be grafted on the pear. There are other ligneous and herbaceous plants the reciprocal graftings of which do not succeed with equal facility. Although the exact cause is unknown, there are in 1 family and sometimes in 1 class species which graft easily, and others which do not. Even when ordinary grafting only is used, successful grafts taken as a criterion of parentage would result in groupings contradicting the best theories established by the natural method. As a result of Carrel's experiments with animal grafting de Candolle's theory has been emphasized to establish the relationship of some of the higher animals with man. The evidence from plant grafts would not indicate that the theory could be successfully applied in this way.—*Chas. H. Otis.*

2518. DETJEN, L. R. *A native prune.* *Bull. Delaware State Bd. Agric.* 10³: 37-42. 1921.—The author reports a plum tree the fruits of which neither dropped nor rotted when ripe. It was named "Herald, because it may be heralding a new race of prunes for eastern America."—*T. F. Manns.*

2519. DOAN, JOHN L. What, why and how much fruit to plant. *Gard. Mag.* 34: 323-324. 1922.

2520. FRANKLIN, H. J. The cranberry industry. *Amer. Cranberry Growers' Assoc. Proc. Ann. Convention* 52: [3-5]. 1921.—Infestations of young open-feeding worms such as gypsy moth, army worms, and span worms can be most easily discovered in their early stages with the help of an insect collecting net. Black leaf "40" is a most valuable insecticide for "black heads," the girdler, and other insect pests. Cooperation with the Weather Bureau coupled with local observation makes possible the prediction of frosts.—*J. K. Shaw.*

2521. GOODMAN, F. L. Blackberry culture. *British Columbia Dept. Agric. Circ. New Hort. Ser.* 57. 9 p., 4 fig. 1921.

2522. HARRISON, G. HALE. Varieties of fruits for the Delaware and Chesapeake Peninsula. *Bull. Delaware State Bd. Agric.* 10³: 14-19. 1921 [Comprising *Trans. Peninsula Hort. Soc.* 1921.]—The author recommends the following apples in order of ripening: Yellow Transparent, Williams Early Red, Duchess of Oldenburg, Northwestern Greening, McIntosh, Grimes Golden, Delicious, Stayman Winesap, Winesap, York Imperial, and Gano. Carman, Hiley, Ray, Belle of Georgia, and Elberta peaches are recommended.—*T. F. Manns.*

2523. HARVEY, E. W. The importance of sulphate of ammonia in horticulture. *Bull. Delaware State Bd. Agric.* 10³: 46-50. 1921.

2524. HEINE, KARL. Die Bedeutung und Anzucht der Haselnüsse. [Importance and growing of hazelnuts.] *Möller's Deutsch. Gärt. Zeitg.* 37: 33-34. 1922.—The following varieties are recommended on a commercial scale in Germany: Italienische Volle, Hallesche Riesennuss, Englische Riesennuss, Burchhardt's Zellernuss, Webb's Preisnuss.—*J. C. Th. Uphof.*

2525. HOLMAN, JAMES D. The scooping of cranberries. *Amer. Cranberry Growers' Assoc. Proc. Ann. Meeting* 52: 1-4. 1922.—Scarcity of labor has led to an increasing use of the scoop for harvesting cranberries. The author began using scoops 25 years ago and has harvested 90 per cent of his crops for the last few years with metal toothed scoops. The bogs are raked each year with knife rakes to take out the top runners. Sanding the bogs produces ideal conditions for scooping. Injurious effects of scooping are believed to be confined to high bog land or bogs where sanding is difficult.—*J. K. Shaw.*

2526. HOLMAN, JAMES D. Twenty years of spraying. *Amer. Cranberry Growers' Assoc. Proc. Ann. Convention* 52: [1-3]. 1921.—Spraying with Bordeaux mixture largely prevents cranberries from deteriorating in transit. It has been found necessary to spray before the bloom opens. The author uses a 3½ horse power engine with 200-250 pounds pressure, and 4 men and a boy can spray 10-15 acres daily. Flooding bogs till July 15 rests the bogs for a season, cleans up most of the grass, and prepares for a heavy crop. Spraying has changed cranberry growing in New Jersey from a hazardous undertaking to a safe investment.—*J. K. Shaw.*

2527. HOSTERMANN, G. Kulturversuche mit elektrischem Licht. [Culture experiments with electric light.] *Gartenwelt* 26: 74-75. 1922.—Excellent results were obtained at the Horticultural College, Dahlem, by the use of Neon light. In the illuminated hot house 500 cucumbers, weighing over 277 kgm., were obtained; in the non-illuminated control house 370, weighing over 188 kgm. Artificial illumination will be of advantage financially early in the season before cucumbers are imported from the Netherlands. Tomatoes gave 96 and 69 kgm. respectively with and without artificial light. The 2nd year 485 cucumbers, weighing 230 kgm., and 370, weighing 165 kgm., and tomatoes weighing 101 and 70 kgm. respectively (being 44 per cent more under electric light) were obtained.—*J. C. Th. Uphof.*

2528. JONES, D. F. One reason why some fruits don't fruit. *Gard. Mag.* 34: 98. 2 fig. 1921.—In this discussion of self-sterility in various fruits it is pointed out that not only are some varieties self-sterile but also cross-sterile in certain combinations.—*H. C. Thompson.*

2529. K., A. [Rev. of: TRIBOLET, I. The pecan nut (*Hicoria pecan*) = *Carya olivaeformis* Nutt. *Jour. Dept. Agric. Union South Africa* 2: 129-132. 1921 (see *Bot. Absts.* 8, Entry 1980).] *Rev. Bot. Appl.* 1: 232, 233. 1921.

2530. K., A. [Rev. of: TRIBOLET, I. Walnuts. *Jour. Dept. Agric. Union South Africa* 2: 80-81. 1921.] *Rev. Bot. Appl.* 1: 232. 1921.

2531. KOCH, F. J. Chan OK and the ginseng trade. *Pharm. Era* 55: 45-47. 1922.—The author describes the cultivation and collection of wild ginseng, and its exportation, valuation, and sale in China.—*C. M. Sterling.*

2532. KRAEMER, HENRY. Practical cultivation of drug plants. *Pharm. Era* 54: 121-124. 1921.

2533. LETACQ, A. [Rev. of: *Compte-rendu du Congrès de la Noix, organisé par la Compagnie P.-L.-M. à Grenoble. October, 1920.*] [Proceedings of the Nut Congress, organized by the P.-L.-M. Company at Grenoble.] *Rev. Bot. Appl.* 1: 229-232. 1921.

2534. MANEY, T. J. Grape production and distribution in western Iowa. *Iowa Agric. Exp. Sta. Bull.* 199. 379-399. 1921.

2535. McCUE, C. A. Some problems of Delaware agriculture. *Bull. Delaware State Bd. Agric.* 10³: 83-90. 1921.—The author emphasizes the problems of marketing, transportation, and production, and points out that the greatest problem in dairying is maintenance of permanent pastures. The need of grape juice factories and better disease control are the problems facing the grape industry. Peach and apple problems are discussed.—*T. F. Manns.*

2536. MIDDLETON, W. A. Cost of producing apples in the Okanagan and average yields and prices for leading varieties. *British Columbia Dept. Agric. Circ.* 38. 15 p. 1921.

2537. MURNEEK, A. E. A new test for maturity of the pear; pear harvesting and storage investigations (third report). *Oregon Agric. Exp. Sta. Bull.* 186. 28 p. 1921.—A new "pressure" test has been developed to measure conveniently the exact stage of maturity of the pear. A detailed description of the apparatus is given. Harvesting of Bartlett's for fresh shipments should commence when the pressure test indicates an average resistance of 35 pounds, and may continue till an average resistance of 25 pounds is reached. Other varieties of pears have different but equally consistent numerical indices. The percentage increase in transverse diameter of a Bartlett pear may be used as an index of the relative percentage increase in weight; the ratio is 1:3.5.—*A. E. Murneek.*

2538. MURRILL, W. A. The banana and its uses. *Sci. Amer.* 125-A (Dec.): 118-119. 2 fig. 1921.—Popular.—*Chas. H. Otis.*

2539. NIEKERK, S. W. VAN. Paarl Viticultural Station. *Jour. Dept. Agric. Union South Africa* 4: 229-232. 4 fig. 1922.—At this station vines from France, Spain, Portugal, Italy, Austria, Algeria, and Sicily are being tested for the production of grapes for wine-making and table purposes. The qualities of some of the varieties are described.—*E. M. Doidge.*

2540. PROSCHOWSKY, A. ROBERTSON. [Rev. of: POPEHOE, WILSON. *Manual of tropical and subtropical fruits.* New York, 1920.] *Rev. Bot. Appl.* 1: 215-229. 1921.—The reviewer states that he is especially interested in this book because the climate of

southern California, mentioned as a promising region for testing tropical fruits, is very similar to that of the Cote d'Azur, southern France, where he himself is experimenting with tropical plants. He agrees that there is an immense field for activity in improving these tropical fruits. In connection with a killing frost at the Cote d'Azur in 1920, he raises the question as to whether it is profitable to attempt to grow in temperate regions plants from a warmer climate and concludes that it is profitable under certain conditions.—He believes that *Persea drymifolia* Cham. & Schlecht. should be considered a variety of *Persea americana* Mill. and not a distinct species as held by Popenoe. The principal fruits mentioned in the book are then taken up, with notes by the reviewer on their behavior on the Cote d'Azur.—P. G. Russell.

2541. RANKE, ALEXANDRA VON. Kulturversuche mit elektrischem Licht. [Culture experiments with electric light.] Gartenwelt 26: 98-99. 1922.—Lettuce plants, variety Bottner's Treib, having 6 leaves, were exposed to electric light and an equal number (32) were used as control plants. After 14 days the former were sufficiently developed to be sold; those grown in daylight matured only after 4-5 weeks. The former were not only better headed, but weighed 50 per cent more. The lilac Andenken an Ludwig Späth flowered under electric light 9 days earlier than in daylight, and flowers of *Viburnum opulus* whitened sooner. Strawberries (Deutsche Evern) illuminated in the middle of November flowered abundantly, and the fruits reached normal size, but did not ripen on account of the cold; none of the control plants finished flowering properly.—J. C. Th. Uphof.

2542. REINKING, O. A., and G. W. GROFF. The Kao Pan seedless Siamese pummelo and its culture. Philippine Jour. Sci. 19: 389-437. Pl. 1-16. 1921 [1922].—This is a comprehensive study of this very superior fruit and its culture. The variety occurs in certain delta regions in Siam where it is extensively cultivated, the water used for irrigation purposes being salt or brackish. Local cultural practices and irrigation by salt or brackish water seem to have a direct relation to the quality of the fruit, and possibly some relationship to the seedlessness.—E. D. Merrill.

2543. RIVIÈRE, GUSTAVE, et GABRIEL BAILHACHE. Contribution à la physiologie de la greffe. Influence du sujet porte-greffe sur le greffon. [Contribution to the physiology of the graft. Influence of the stock on the scion.] Jour. Soc. Nation. Hort. France 20: 361-362. 1920.—Of pear trees grafted on the same stock those making the greatest growth had been planted so deeply that roots formed above the graft union, while those which had made the least growth had no roots above the graft union. In the latter case the stock had a greater influence on the scion than in the former.—H. C. Thompson.

2544. RIVIÈRE, GUSTAVE, et GABRIEL BAILHACHE. De l'atmosphère des pommes. [The air in the apple.] Jour. Soc. Nation. Hort. France 22: 263-265. 1921.—A discussion is given of the air or gases in the cells of apples, to which is attributed their low density as compared to the pear. A table gives the total volume and composition of the gases in the fruit at different times.—H. C. Thompson.

2545. RIVIÈRE, GUSTAVE. De la suppression partielle des fleurs du poirier. [Partial suppression of flowers of the pear.] Jour. Soc. Nation. Hort. France 22: 336-337. 1921.—After experiments in removing some of the flowers in the cluster the author concludes that it is of no value.—H. C. Thompson.

2546. ROCK, J. F. The Akala berry of Hawaii. Jour. Heredity 12: 147-150. Pl. 3. 1921.—The Akala berry (*Rubus macraei* Gray) is a variable species found on several islands of the Hawaii group as, for example, Kauai, Molokai, Maui, and Hawaii. On Kauai, it is an upright spineless shrub a few feet high with rather small dry berries. This type was placed by Hillebrand under *Rubus hawaiiensis*, with which it has little relationship. On Maui the plants resemble the typical species from Hawaii, the type locality, but the plants are exceedingly spiny and the fruits but half the size of those found on Hawaii. The species is best developed

on the slopes of the high mountains of Hawaii proper,—Hualalai, Mauna Loa and Mauna Kia. The largest fruited specimens were discovered on a small volcanic cone of greater age than the country surrounding it. The cone, known as Hinakapanula, is located at an elevation of 6,000 feet in a desert lava field. While there was no vegetation in the surrounding cinder plain, the cone was a mass of jungle, having escaped the destructive lava flow. The plants were mainly *Acacia koa hawaiiensis*, *Coprosma pubens*, *Styphelia tameiameia*, and *Rubus macraei*. Here the last was not an upright shrub but a huge liana some 20 feet in height with a woody stem 2 inches in diameter. The berries were a dark rich purple 2 inches in diameter, and the plants were spineless. In the fern forests near the volcano of Kilauea, *Rubus macraei* occurs as an epiphyte in the forks of moss-covered trees. It was found to cover many acres on the cool windward slopes of Mauna Kea at an elevation of 6,000 feet. In this locality were found 2 color varieties, dark purple and orange-yellow. The yellow fruits were fully as large as, if not larger than, the purple fruits. The yellow-fruited plants were quite spiny, but the purple-fruited plants were almost spineless, only the young shoots being armed. The purple fruits were slightly bitter, the yellow fruits quite sweet.—The author suggests that hybridization may accomplish much with this species, which seems best adapted to the Pacific slope.—*J. H. Kempton.*

2547. ROSA, J. T., JR. Investigations on the hardening process in vegetable plants. Missouri Agric. Exp. Sta. Res. Bull. 48. 97 p., 7 pl., 9 fig. 1921.—Any treatment checking plant growth increases cold resistance. Hardened cabbage plants contain more “unfree” water, as measured by the dilatometer, than tender plants, the increment corresponding to the extent of growth-checking and to the degree of cold resistance. The actual amount of water unfrozen at any temperature is greater in hardened than in tender leaves, though the total moisture content be less. The percentage of total moisture frozen in leaves increases but the increment decreases as the temperature is lowered. In cabbage the hardening process is associated with a proportional increase in the amount of water unfrozen at -5°C . Hardened cabbage loses less water by transpiration per unit leaf area than tender. This and the smaller area of hardened plants permits transplanting with less wilting. The rate of water loss in an oven at 60°C . is lower from hardened cabbage leaves than from tender. With tomato, less difference was found, and the rate of loss from hardened cabbage is lower than from tomato subjected to similar treatment. It is concluded that hardening increases water-retaining capacity within the cells. This is associated partly with increased osmotic concentration resulting from decrease in amount of free water but more particularly with increase in pentosan content. Pentosan content of cabbage under hardening treatment increases most rapidly the 1st 5 days. The pentosan content of cabbage, kale, and celery grown in the open increases as the weather becomes colder in the fall. The hot-water soluble pentosan content is closely correlated with water-retaining capacity and hardness, more so than the total pentosan content. In plants susceptible of hardening the hot-water soluble pentosan content is relatively high and increases on hardening treatment; in plants like the tomato which are not susceptible of much hardening, the hot-water soluble fraction is low and does not increase with hardening treatments, though the total pentosan content is appreciable.—*H. D. Hooker, Jr.*

2548. ROSENTHAL, H. Unsere besten Johannisbeer-Sorten für den Erwerbsobstbau. [Our best current varieties for commercial fruit growing.] Möller's Deutsch. Gärt. Zeitg. 37: 8-9, 19. Fig. 1-8. 1922.—Studies were made to determine the best varieties of currants for commercial purposes. The following red currants are recommended: Rote Holländische (red Dutch), Roter Versailler (red Versaille), Houghton Castle, and Erstling aus Vierlanden. Of white currants are recommended: Weisse Holländische (white Dutch), Weisse Versailler (white Versaille), and Langtraubige Weisse. Of black currants 2 are mentioned: Langtraubige Schwarze, an early, and Goliath, a late variety.—*J. C. Th. Uphof.*

2549. SCHIPPER, J. Birnen am Spalier. [Pears on espaliers.] Gartenwelt 26: 122. Fig. 1-4. 1922.—The variety Sterkmanns is especially recommended for espaliers. The

plants and fruits are less subject to diseases. This variety should be grown as pyramids or standards only in the best situated orchards.—*J. C. Th. Uphof.*

2550. STAVENHAGEN, RICHARD. *Erwerbgärtenbau und Verteuerung des Verkehrswesens.* [Commercial horticulture and increase in cost of shipping.] *Gartenwelt* 26: 81-82, 94-95. 1922.—The author discusses the high cost of shipping ornamental trees, fruit trees, vegetables, and other horticultural products in Germany.—*J. C. Th. Uphof.*

2551. THAYER, PAUL. Bracing apple trees. *Monthly Bull. Ohio Agric. Exp. Sta.* 6: 172-175. 4 pl. 1921.—The author points out the great difficulty in shaping trees to avoid splitting when fully developed. It is often possible to intertwine branches to eventually form a natural graft to serve as a brace. Where this method is not possible, the iron rod form of brace has been serviceable.—*R. C. Thomas.*

2552. THEISS, LEWIS, and MARY [THEISS]. By all means plant nut trees. *Gard. Mag.* 34: 94-97. 5 fig. 1921.

2553. TRUELLE, A. Production et commerce des olives. [Olives, production and trade.] *La Nature* 1922: Suppl. 71-72. 1922.—The topics discussed are: area devoted to olives in France; varieties, including varieties for special purposes; statistics on production in French provinces; and data on prices and exportation.—*J. R. Schramm.*

2554. WATSON, ELBA E. Weeds in the cranberry bog. *Amer. Cranberry Growers' Assoc. Proc. Ann. Convention* 52: [5-7]. 1921.—The best method of complete elimination of weeds is the mechanical removal of the plants, but this is in many cases impossible. *Carex bullata* is best controlled by drainage. Certain ferns can be eliminated by persistent mowing every 2 weeks, or better by pouring concentrated sulphuric acid into the base of each tuft of leaves. Several other weeds are discussed and their control by drainage or mechanical elimination recommended.—*J. K. Shaw.*

2555. WEISS, HARRY B. Results of a recent survey of the cranberry acreage of New Jersey. *Amer. Cranberry Growers' Assoc. Proc. Ann. Meeting* 52: 4-9. 1922.—The 1920 Federal Census showed a decrease of 27 per cent from the acreage of 1909. It became definitely known that about 20 per cent of the growers were missed by the Federal enumerators. A survey by the state department of agriculture and experiment station showed a total of 12,205 acres, whereas the Federal census gave 6,583 acres. There were found a total of 227 growers having an average of 54 acres each. The acreage of bearing and non-bearing bogs, of different varieties, also production in 1921 and various statistics of bog management are given.—*J. K. Shaw.*

2556. WESTER, P. J. Description list of mango varieties in India. *Philippine Agric. Rev.* 13: 265-352. Fig. 1-71. 1921.

2557. WHITE, E. W. Strawberry culture. *British Columbia Dept. Agric. Circ. New Hort. Ser.* 58. 14 p., 25 fig. 1922.

2558. WÜRZNER, O. Die Düngung der Reben nach den neuesten Erfahrungen. [Fertilizing grapes in accordance with recent experience.] *Mitteil. Deutsch. Landw. Ges.* 37: Flugbl. 61. 1922.—Popular.—*A. J. Pieters.*

FLORICULTURE AND ORNAMENTAL HORTICULTURE

2559. ANONYMOUS. Planting now for birds the year through. *Gard. Mag.* 34: 77. 1921.—This article lists plants under the following headings: (1) for summer food supply, (2) affording food in winter, and (3) evergreens that furnish food. The kinds of birds which eat the fruits or seeds of each kind of plant are also given.—*H. C. Thompson.*

2560. ANONYMOUS. The Regal lily for every man's garden. *Gard. Mag.* 34: 99. 1 fig. 1921.

2561. BARRON, LEONARD. Reconsidering the Camellia. *Gard. Mag.* 34: 298-299. 3 fig. 1922.

2562. BEACH, JOHN B. The Australian "pine." *Florida Grower* 25: 6-7. 1922.—*Casuarina* should be more generally planted in Florida. It will thrive in the poorest, driest, windiest, and wet situations. *C. equisetifolia* is rather susceptible to cold. *C. Cunninghamiana* endured a temperature of 20°F. It is immune to attacks of Florida insects, and is recommended for roadside planting.—J. C. Th. Uphof.

2563. BINNEWIES, E. Aufgaben für die Hochzucht der Cyclamen. [Directions on breeding cyclamen.] *Gartenwelt* 26: 65-68. Fig. 1-16. 1922.—This is a practical treatise on the breeding of cyclamen in Germany.—J. C. Th. Uphof.

2564. BULTEL, G. Note sur la germination des graines d'Orchidées à l'aide du champignon. [Note on the germination of orchid seed with the aid of endophytic fungi.] *Jour. Soc. Nation. Hort. France* 21: 434-437. 1920.—This article gives the results of various experiments in germinating seed of different species of orchids in various media.—H. C. Thompson.

2565. CALVINO, MARIO. El jardín Cabada de Cienfuegos. [The Cabada garden at Cienfuegos.] *Rev. Agric. Com. y Trab. [Cuba]* 4: 568-569. 3 pl. 1921.—"The Palms," a private garden at Cienfuegos, offers interesting specimens of tropical vegetation, especially of palms, *Corypha Umbraculifera* L. from Malabar and Ceylon, *Acrocomia lasiospatha* Mart. from Cuba, and *Latania Loddigesii* Mart. or *L. glaucophylla* Hort. from the island of Mauritius being represented.—G. R. Hoerner.

2566. CALVINO, M[ARIO]. Tratado sobre la multiplicacion de plantas. [A treatise on the propagation of plants.] 264 p., 239 fig. Habana, Cuba. 1920.—The subject is treated under the following main headings: manner of plant multiplication, sexual and asexual; multiplication and propagation; direct multiplication; dissemination and seeding; indirect multiplication. Fully half of the book is given to a careful consideration of sexual propagation. Some of the chapter headings follow: seed purity and methods for its determination; mineral impurities; diaphanoscopic methods; germinability and germinators; constants; calculations relating to the use of mixed seeds; standards of purity; Mendelian ratios; the work of Nilsson; correlation and meteorological influences upon plant characters; seed and seed preparation; methods for obtaining seed from fruit; the chronology of seeding; plans for seeding and arrangement; transplants; protection of the transplanted seedlings; physiological requirements of plants at various stages of seedling development; soil sterilization methods, etc. Multiplication is discussed for bulbs, rhizomes, tubers, stolons, etc. Fumigations and plant treatments, graft affinities, methods of manipulation and execution, waxes, etc., are also discussed. A few remarks upon propagation of non-flowering plants are also appended. There are frequent references to a comprehensive international literature. Although the book is written with warm-climate plants as constant examples, it is a compilation of methods and knowledge for various climates.—A. Bonazzi.

2567. CALVINO, M[ARIO]. Un plátano porta-semilla. [A seed-bearing plantain.] *Rev. Agric. Com. y Trab. [Cuba]* 4: 570-571. 2 pl. 1921.—A plantain, supposedly *Musa rhodochlamys*, bearing seed was located in the Cabada garden at Cienfuegos. The seed was planted to obtain material for breeding purposes, the object being to secure hybrids having the vigorous growth characters and qualities of resistance to the Panama disease of the seedling parents as well as the valuable fruiting propensities of the other varieties entering into the cross.—G. R. Hoerner.

2568. CAMPBELL, JOHN COLLINS. Making a lawn that will last. Stage I.—Soil preparation, grading and fertilizing. Gard. Mag. 34: 254-255. 2 fig. 1922.

2569. CHAMBERLAIN, MONTAGUE. A handful of top-notch gladiolus. Gard. Mag. 35: 111-112. Fig 1. 1922.

2570. COLLINS, J. L. The new craft of making plants to order. III. What can we do to increase and better the fruit crop. Gard. Mag. 34: 152-154. 3 fig. 1922.

2571. COOK, W. A. Ornamental planting. Florida Grower 25¹¹: 7. 1922.—A general account of planting ornamental shrubs in gardens of Florida is given. Shrubs with fine foliage and a somewhat willowy growth are most effective. For background purposes the following are recommended: *Rhodomyrtus*, *Forestiera*, *Eugenia Hookeriana*, *Ilex paraguariensis*, *Thunbergia erecta*, and *Myrtus communis*. For the front, plants of lower and weeping habit and harmonizing in color of bloom, etc., are recommended: *Jasminum pubescens*, *J. gracillimum*, *J. primulinum*, *Plumbago*, *Strobilanthes*, *Viburnum suspensum*, *Eugenia uniflora*, *Triphasia*, *Severinia*, and *Abelia*. For securing an effect of strength in character plants with wide projecting angles are recommended, especially species with a coarse foliage, such as *Pittosporum tobira*, *Prunus Laurocerasus*, *Ligustrum lucidum*, *L. nepalense*, *Michelia fuscata*, *Myrica cerifera*, and *Psidium cattleianum*. Before buildings the use of plants with a coarse wall texture are recommended, as *Hibiscus*, *Allamanda*, *Daedalacanthus*, *Hamelia*, *Tabernaemontana*, and *Viburnum odoratissimum*. *Poinsettias*, with their ragged-stemmed appearance, must be carefully used.—J. C. Th. Uphof.

2572. CORREVON, HENRI. Bringing alpine plants into our gardens. II. LOWN, CLARENCE. The lessons of a life-time with mountain plants. Gard. Mag. 34: 316-321. 3 fig. 1922.

2573. DANIELS, MARK. Shore-line gardens of the Pacific. Gard. Mag. 34: 181-184. 2 fig. 1921.

2574. EATON, FLORENCE TAFT. A little corner in natives—wild flowers that flourish in the shade, giving a foundation planting of graceful informality. Gard. Mag. 35: 96-97. 2 fig. 1922.—The author discusses the use of native flowers such as *Viola cucullata*, mandrake, ferns, false Solomon's-seal, lady slipper, Canada lily, meadow-rue, wild iris, trillium, Joe-pye weed, black-eyed Susan, goldenrod, and maidenhair fern.—H. C. Thompson.

2575. EDMINISTER, ALLEN W. What can I grow in the shade? Gard. Mag. 35: 119. 1922. The following flowering perennials are mentioned as thriving in the shade: cornflower, forget-me-not, godetia, namophila, pansy, and bellflowers. The annuals mentioned are balsam, verbena, stock, basket-flower, clarkia, zinnia. A chart indicates the color of the flowers, the date of seeding, time of flowering, height of plants, and kind of soil required by each.—H. C. Thompson.

2576. FOWLER, CLARENCE. That elusive element of beauty in the rock garden. Gard. Mag. 34: 302-304. 2 fig. 1921.

2577. GHENT, W. J. My Los Angeles suburban garden. Gard. Mag. 34: 206-208. 3 fig. 1921.

2578. GIBSON, HENRY. Getting the best bloom from the bulbs. Gard. Mag. 34: 78-82. 5 fig. 1921.—The author discusses the growing of lilies, daffodils, tulips, hyacinths, crocus, etc., with methods of planting and care of beds.—H. C. Thompson.

2579. GOULD, ALBERT R. Continuous bloom for the California garden. Gard. Mag. 34: 177. 1921.—Brief directions for growing annual and perennial herbaceous flowering plants are given.—H. C. Thompson.

2580. GRAMM, F. C. *Meine Richtlinien der Gladiolen-Zucht.* [My directions for gladiolus breeding.] Möller's Deutsch. Gärt. Zeitg. 37: 1-2. Fig. 1. 1922.

2581. GROSSENBACHER, J. G. Toll taken by shade trees. Florida Grower 25¹³: 7. 1922.—Australian pine (*Casuarina*) and *Eucalyptus* are not injurious to Florida grove trees along the highways, but the water oaks (*Quercus laurifolia*) have proved to be very harmful from this standpoint.—J. C. Th. Uphof.

2582. HATFIELD, T. D. Trees destroyed by ice in New England. Gard. Mag. 34: 293. 1 fig. 1922.

2583. JAEGER, GERH. *Iris germanica* Treiberei. [Forcing *Iris germanica*.] Möller's Deutsch. Gärt. Zeitg. 37: 38-39. 1922.—The best varieties for forcing are *I. germanica atrovioacea* and *I. germanica Gambetta*. Plants are placed in the hot house from January 15 until February 20 at a distance of 1 m. from the glass. During transplanting from the field the roots must be surrounded by soil. Temperature in the hot house should be 6-8°C., later 10-12°C. Fresh air should be given during sunshine, but the atmosphere must remain moist. Flower stems appear in the middle of March.—J. C. Th. Uphof.

2584. JUNGE, H[EINRICH]. *Aster amellus*. Möller's Deutsch. Gärt. Zeitg. 37: 57, 73-74. 1922.—Several garden varieties of *Aster amellus* originated in Germany and other countries are described.—J. C. Th. Uphof.

2585. JUNGE, HEINRICH. *Delphinium sulphurium*. Möllers Deutsch. Gärt. Zeitg. 37: 37-39. Fig. 1-2. 1922.—This plant develops tubers and is therefore difficult to propagate by division. It is usually grown from seed. Porous soil is recommended since too much moisture is harmful. Plants begin to flower the 2nd year.—J. C. Th. Uphof.

2586. KACHE, PAUL. *Primula Forbesi* und *malacoides*. Gartenwelt 26: 46-48. 1922.—The 2 species are recommended as pot plants. The growing period is conspicuously short, *P. malacoides* flowering within 6-7 months and *P. Forbesi* within 4-5 months. As plants do not expand greatly, small pots only are necessary. The seeds are sown during May-July in seed pans. They should be slightly covered with fine earth after germination. The seedlings must be transplanted and given fresh air. Sometimes it is necessary to transplant twice before putting in final pots. *P. Forbesi* starts flowering the middle of September; *P. malacoides* flowers during the winter.—J. C. Th. Uphof.

2587. KACHE, PAUL. *Schizanthus Wisetoniensis*. Gartenwelt 26: 3-4. Fig. 1. 1922.—*Schizanthus Wisetoniensis* is recommended as a pot plant. It flowers 4-6 months after planting the seed, depending on the season of the year.—J. C. Th. Uphof.

2588. KELSEY, F. W. The landscape value of trees. Amer. Forestry 28: 47. 1922.

2589. KNEBEL, CURT. *Myosotis* "Hindenburg." Gartenwelt 26: 48-49. 1922.—*Myosotis oblongata* "Hindenburg" is recommended as being resistant to cold (-10-12°C.).—J. C. Th. Uphof.

2590. KORDES, W. *Unsere drei neue Rosenneuheiten für Herbst 1922.* [Three rose novelties for autumn, 1922.] Möller's Deutsch. Gärt. Zeitg. 37: 30-31. 1922.—The rose hybrid Wilhelm Kordes (Gorgeous × Adolf Koschel) has brownish red flowers of medium size. Flowers of S. S. Pennock (Mrs. George Shawyer × Lieutenant Chaure) resemble those of Papa Gontier, being borne on long stems. They are recommended for cut flowers and for forcing. Camillo Schneider (Comte. G. de Rochemur × Lieutenant Chaure) is a strong grower with blood-red flowers and is likewise recommended for cut flowers.—J. C. Th. Uphof.

2591. KRAUSS. Das Versuchsfeld der deutschen Dahlien-Gesellschaft im Palmengarten in Frankfurt a. M. 1921. [The experimental field of the German Dahlia Society in the Palm-garden at Frankfurt a. M., 1921.] Gartenwelt 26: 119-122. 1922.—The year 1921 was very dry, therefore many results were not good. Tests were made of 115 dahlia varieties from 8 firms. Of the newer important varieties are mentioned: Heimat, purple violet flowers, very good; Herzblut, one of the best dark red flowering kinds; Perle von Dresden, with carmin-violet, well filled flowers; Marlitt, which flowers very early and is suitable for bouquets; Hilligenlei, conspicuous pink flowers; Artur Lambert (Pompon group), with unusually dark violet flowers; Heinerle (Pompon group), dwarf, with dark purple-red flowers; Eberharde, light scarlet, very early flowering; Iphigenie (a sport of the Goethe), beautiful flowers of wine-red and violet; Cactus, flowers yellow and very large.—J. C. Th. Uphof.

2592. KRUHM, ADOLPH. What, why and how much among the accommodating annuals. Gard. Mag. 34: 294-297. 1 fig. 1922.—The subject is treated under the following headings: flowers in an all-season border; what to grow for cut flowers; when it comes to colors; annuals for screens and shade; if your garden is small; for biggest effect in the small garden; the ever-present problem of quantity; words of warning and hints of permanency; and for that shady nook.—H. C. Thompson.

2593. LESKE, A. Chrysanthemum Neuheiten. [Chrysanthemum novelties.] Möller's Deutsch. Gärt. Zeitg. 37: 2. Fig. 1-2. 1922.—As new varieties the author mentions: Erika Leske (strong growth, pink flower with a creamy gloss); Helen von Zimmermann (flowers copper-colored, turned petals, suitable for pot culture and for cut flowers); Elfriede Stiff (flowers yellow center, inside margin of petals white, outside wine-red, large flowering, strong growth); Gruss an Neumuhl (flowers orange red, small; recommended for gardens); Lorelei (flowers violet, large, strong growth, recommended for table decoration).—J. C. Th. Uphof.

2594. McDUGAL, D. T. How mountain plants behave when they go to the seaside. Gard. Mag. 34: 305-307. 1 fig. 1922.

2595. MIDDLETON, M. S. Planting plans and distances. British Columbia Dept. Agric. Circ. New Hort. Ser. 62. 6 p. 1921.

2596. MITCHELL, SYDNEY B. A Spanish border for California gardens. Gard. Mag. 34: 204-205. 1921.

2597. MULFORD, F. L. Broad-leaved evergreen shrubs for the South. Amer. Forestry 28: 99-104. 9 fig. 1922.

2598. MÜLLER, GUSTAV. Begonia elatior. Möller's Deutsch. Gärt. Zeitg. 37: 69-70. Fig. 1-2. 1922.—*Begonia elatior* belongs to the winter flowering Ensign group and is easily propagated from cuttings in May. Young plants grow rapidly and flower early and profusely.—J. C. Th. Uphof.

2599. NORTON, J. B. S. What America has done for the Dahlia. II. LYMBERRY, ELIZABETH. The Dahlias apotheosis in the Sunset State. Gard. Mag. 34: 192-197. 11 fig. 1921.

2600. OLIVE, CHARLES. Winter housing for roots and bulbs. Gard. Mag. 34: 88. 1921.

2601. PIFFL, HUGO. Die Gärtnerei in Bosnien und Herzogowina. [Horticulture in Bosnia and Herzogowina.] Gartenwelt 26: 144-146. 1922.

2602. RAWLINSON, ANNIE COCHRAN. Trees that best resist ice storms. *Gard. Mag.* 34: 103-104. 1921.—The author places horse chestnut, oak, shagbark hickory, and red maple at the head of the list. Those most easily injured are willow, poplar, paulownia, white birch, silver maple, and white ash. Evergreens mentioned as being very resistant to ice injury are spruces, firs, junipers, white pine, and pitch pine.—*H. C. Thompson.*

2603. SAKAMOTO, KIYOSHI. Following the chrysanthemum to the land of its inheritance. *Gard. Mag.* 34: 133-135. 5 fig. 1922.

2604. SEIDEL, T. J. Sind auf Rhododendron veredelten Azaleen zur Frühreiberei verwendbar? [Are Azaleas grafted on Rhododendron stock suitable for early forcing?] *Gartenwelt* 26: 28. 1922.—Azaleas grafted on Rhododendron Cunningham White are very suitable for early forcing, especially the varieties Deutsche Perle, Simon Mardner, Paul Schame, Emile Liebig, Eggebrechti, Herme, and Fritz Seidel.—*J. C. Th. Uphof.*

2605. STANTON, CARL. Making a garden plan for yourself. *Gard. Mag.* 34: 233-236. 7 fig. 1922.—The author discusses location of house and garages, garden, etc., and arrangement of ornamental plantings.—*H. C. Thompson.*

2606. STANTON, CARL. Winter quarters for tender perennials, etc. *Gard. Mag.* 34: 88-89. 1921.—The author describes a storage room for various plants and plant products, and gives a chart showing planting date, storing date, storage temperature, location in storage room, and methods of storing various vegetables and flowers.—*H. C. Thompson.*

2607. STILES, E. C. Tying the house to the garden. *Gard. Mag.* 35: 99-104. 6 fig. 1922.—The author discusses various types of plantings to make the dwelling fit into the picture.—*H. C. Thompson.*

2608. STOLDT, C. Die Handelswichtigsten Typen meiner Cyklamenzucht. [The most important commercial types of my cyclamen breeding.] *Gartenwelt* 26: 76. Fig. 1-9. 1922.—In breeding cyclamen the shape and color of the flowers, richness of flowering, compact but strong growth, and color of leaves are of much importance. Cyclamen Rosa von Marienthal originated in 1883; Kätschen Stoldt in 1890; Ruhm von Wansbek and Rosa von Wansbek in 1906; Feurling Lachsrot is of recent origin. The 9 figures show different types of flowers.—*J. C. Th. Uphof.*

2609. THEISS, L. E. Hedges out of the ordinary. *Amer. Forestry* 27: 689-693. 7 fig. 1921.—Hedges of garden currant, European filbert, gooseberry, blackberry, and dwarf pear are advocated for beauty and utility.—*Chas. H. Otis.*

2610. THORNE, HELEN S. When an Easterner gardens in the Golden West. *Gard. Mag.* 34: 178-180. 5 fig. 1921.

2611. WILD, HENRY. Evergreens that keep green in winter. *Gard. Mag.* 34: 90-93. 3 fig. 1921.

2612. WILDER, LOUISE B. Bringing alpine plants into our gardens. III. Rock plants and alpiners raised from seed. *Gard. Mag.* 34: 320-321. 1922.

2613. WILDER, LOUISE B. Old-fashioned gardens that continue to charm. *Gard. Mag.* 34: 130-133. 2 fig. 1922.

2614. WOODMAN, ALLISON MORRIS. Picturesque values of Eucalyptus. *Gard. Mag.* 34: 199-201. 4 fig. 1921.

2615. ZORNITZ, H. Mehr Statice. [More statice.] Möller's Deutsch. Gärt. Zeitg. 37: 73. Fig. 1. 1922.—Near Bad Rastenberg, Thüringen, *Statice incana hybrida* and *S. tatarica* are grown in large quantities for the winter, the yearly harvest being 9,000-10,000 kgm.—J. C. Th. Uphof.

VEGETABLE CULTURE

2616. ANONYMOUS. Sortenanbauversuche mit Frühkarotten in Jahre 1921. [Variety studies with early carrots in 1921.] Mitteil. Deutsch. Landw. Ges. 37: 107-108. 1922.—In this report of comparative tests of the varieties "Pariser Markt" and "Duwiker" made at 5 stations, most of the data are given in tabular form.—A. J. Pieters.

2617. DUCOMET, V. De la dégénérescence des végétaux multipliés par voie asexuée. (En particulier de la pomme de terre.) [Degeneration of vegetables propagated by asexual means. With particular reference to the potato.] Jour. Soc. Nation. Hort. France 22: 255-273. 1921.

2618. GANG, MAX. Gurkenkultur in kalten Kasten. [Cucumber growing in cold frames.] Möller's Deutsch. Gärt. Zeitg. 37: 9-10, 25-26. 1922.

2619. KEIL, J. B. Variety trials of lettuce. Monthly Bull. Ohio. Agric. Exp. Sta. 6: 139-148. 1921.—A brief, concise, and comprehensive discussion, on the basis of extensive variety trials, is given of the relative merits and weaknesses of 16 of the more desirable varieties of lettuce of the head, leaf, and cos types.—R. C. Thomas.

2620. KERLE, W. D. Onion-growing in New South Wales. Agric. Gaz. New South Wales 33: 53-55. 1922.—Onions yielded up to 12.85 tons per acre at Dorrigo. Notes on varieties and methods of culture are given.—L. R. Waldron.

2621. ROUNDS, ARTHUR W. Tomato growing. Bull. Delaware State Bd. Agric. 10³: 70-72. 1921.—The author reports 29.5 tons from 2 acres, grown at a cost of 12.26 per ton. A detailed report of items is given.—T. F. Manns.

2622. RUTHLEDGE, A. Possibilities of potted cauliflower. Gard. Mag. 34: 106. 1921.

2623. STEED, THOS. J. Seed sowing. Charts for the western gardener. Gard. Mag. 34: 185-186. 1921.—The author discusses annual flowering plants for the region west of the Cascades and gives a chart showing depth to cover seed, spacing, and time to plant, manure and fertilizers per square yard, etc., for a long list of annuals. Similar information is given for vegetables for Central and Western States. The chart for vegetables includes the number of days to maturity, suggested varieties, and planting directions.—H. C. Thompson.

2624. WHITE, THOS. H. The future of the tomato growing industry. Bull. Delaware State Bd. Agric. 10³: 64-70. 1921.—The author reviews prices, cultures, and canning practices on the Delaware-Chesapeake Peninsula, and recommends more intensive culture, smaller acreage, better manured and fertilized land, and early hot-bed-grown plants.—T. F. Manns.

2625. YOUNG, ROBERT A. Forcing and blanching dasheen shoots. U. S. Dept. Agric. Dept. Circ. 125. 6 p., 5 fig. 1920.—The culture and uses of dasheen are discussed.—L. R. Hesler.

MORPHOLOGY, ANATOMY AND HISTOLOGY OF VASCULAR PLANTS

E. W. SINNOTT, *Editor*

(See also in this issue Entries 2100, 2170, 2179, 2245, 2282, 2296, 2297, 2491, 2722, 2836, 2917, 2976, 2977, 3071, 3085, 3214, 3228, 3242, 3258)

2626. ANONYMOUS. An "oven plant." *Sci. Amer. Monthly* 3: 518. 1921.—The pollination mechanism of *Arum maculatum* is described.—*Chas. H. Otis.*

2627. ANONYMOUS. Graft hybrids. *Nature* 109: 27-28. 1922.—Instances of this phenomenon (from paper by WEISS at British Association) are given.—*O. A. Stevens.*

2628. BARKER, E. E. The architecture of the coco palm. *Nat. Study Rev.* 18: 44-50. 1922.—A popular account is given of the gross anatomy of the tree and fruit.—*W. L. Eikenberry.*

2629. DASTUR, R. H. Notes on the development of the ovule, embryo sac and embryo of *Hydnora africana* Thunb. *Trans. Roy. Soc. South Africa* 10: 27-31. *Fig. 1-13.* 1921.—The ovule of *Hydnora* is orthotropous with a single integument. The megaspore mother cell is hypodermal and becomes the embryo sac. The proembryo consists of a row of about 15 cells. The embryo is produced from the middle region of the proembryo and no differentiation had taken place in the latest stages seen.—*E. M. Doidge.*

2630. GILLIES, C. D., and C. T. WHITE. On the occurrence of abortive styles in *Buckinghamia celsissima*. *Proc. Roy. Soc. Queensland* 31: 42-45. *Fig. 1-2.* 1920.—In 1918 Longman and White described a mutant of *Buckinghamia celsissima* [see Bot. Absts. 1, Entry 913]. The flowers of this species normally possess a semi-annular hypogynous gland situated at the base of the stipes, but in the mutant the gland is divided into a number of segments and 2 accessory styliform structures accompany the pistil. As the result of anatomical studies, the authors conclude that the styliform structures are really abortive styles and not segments of the hypogynous gland as maintained by Longman and White, and that their development has caused splitting of the hypogynous gland into distinct segments.—*J. H. Faull.*

2631. JANSE, J. M. Ein Blattsteckling von *Camellia japonica* mit Adventivknospe. [A leaf-cutting of *Camellia japonica* with adventive bud.] *Flora* 114: 401-404. 1 *fig.* 1921.—A leaf-cutting of *Camellia japonica* at the end of 1 year had produced 2 roots and after 2½ years gave rise to a leafy shoot.—*A. G. Stokey.*

2632. LANSDELL, K. A. Weeds of South Africa VI. *Jour. Dept. Agric. Union South Africa* 4: 542-549. *Pl. 1-6.* 1922.—An account is given of the structure and life history of the spear thistle, *Cnicus lanceolatus* L.—*E. M. Doidge.*

2633. OSBORNE, T. G. B. Some observations on *Isoetes Drummondii*, A. Br. *Ann. Botany* 36: 41-54. 15 *fig.* 1922.—*Isoetes Drummondii*, a small species recorded from widely separated places in Australia, grows in soil which is wet but not submerged in the rainy season and baked hard in the dry season. The stock which is buried in the soil is trilobed, the projecting portion of each lobe being built up of a number of caps which represent the whole of the leaf- and root-bearing portions developed in previous seasons. The caps are cut off as a result of the regular alternation of well-marked growing and resting seasons. At the approach of the dry season the leaves dry up leaving their tough bases and the sporangia attached to the stock and buried in the soil. By this time pads of mucilage cells have been formed at the bases of the sporophylls. At the beginning of the following rainy season the mucilage cells absorb water, expand tremendously, and force the leaf bases with their sporangia through the soil to the

surface. The opening of the sporangium depends on a difference in tension between the inner and outer surfaces of the wall following the absorption of water. It ruptures, is torn away from the sporophyll, and rapidly rolls up inside out.—*W. P. Thompson.*

2634. PLANTEFOL, LUCIEN. Sur des épis tératologiques du *Plantago lanceolata* L. [On abnormal inflorescences of *Plantago lanceolata*.] *Compt. Rend. Acad. Sci. Paris* 173: 1108–1111. 1921.—The paper presents a classification of the abnormal inflorescences of this species as follows: (1) Phyllody of the bracts; bracts fewer in number and developing similarly to the leaves of the rosette. (2) Abortion of flowers of the spike. (3) Presence of secondary spikes inserted on the primary ones. (4) Modification of the pubescence of the axis of the spike.—*C. H. Farr.*

2635. SPRAGUE, T. A. The seedling foliage of *Ulex Gallii*. *Jour. Botany* 60: 6–12. 1922.—A detailed study was made of 500 seedlings of *Ulex Gallii* to find about how long the compound leaves persisted. Among the results obtained were the following: 96.6 per cent of the seedlings bore from 1 to 11 compound leaves after the cotyledons and before the continuously simple leaves appeared; 48.8 per cent had both leaves of the 1st pair trifoliate and all the following simple; no compound leaves were found after the 6th pair and many variations in the numbers of trifoliate and bifoliate leaves occurred.—*Adele Lewis Grant.*

2636. TAYLOR, WM. RANDOLPH. The embryogeny of *Cyrtanthus parviflorus* Baker. *Amer. Jour. Bot.* 8: 502–506. 2 pl. 1921.—The structure and development of the embryo in this species were studied from fertilization to the mature seed. The cotyledon originates as a terminal structure and is always single. The development of the embryo is essentially like that of typical monocotyledons. This species of *Cyrtanthus* is therefore quite different in its embryological history from *C. sanguineus* as described by Farrell and by Coulter and Land, where the very young embryo has a cotyledonary tube surmounted by 2 growing points, 1 of which finally greatly surpasses the other and becomes the cotyledon. The conclusions as to the character and evolutionary history of the cotyledon of monocotyledons which have been drawn from *C. sanguineus* are therefore not supported by conditions in *C. parviflorus* although the 2 species are closely related taxonomically.—*E. W. Sinnott.*

2637. THOMPSON, H. STUART. *Carex* forms with long peduncles. *Jour. Botany* 60: 12–13. 1922.—The author notes that several species of *Carex* occasionally produce long-peduncled flowers. The specimens noted were collected in England.—*Adele Lewis Grant.*

2638. TURRILL, W. B. Abnormal flowers in *Eranthis*. *Ann. Botany* 36: 131–133. 12 fig. 1922.—A specimen of *Eranthis cilicica* grown in a pot showed many floral abnormalities such as honey glands with expanded blades and combined stamens and carpels. In some cases ovules and anther lobes with good pollen were borne in the same structure, the ovules frequently being in an open carpel with style above the anther lobes.—*W. P. Thompson.*

2639. WILLIAMSON, HELEN STUART. Some experiments on the action of wood on photographic plates. *Ann. Botany* 36: 91–100. Pl. 11. 1922.—Specimens of wood when placed in contact with a photographic plate have a definite action on the plate due to their giving off hydrogen peroxide. The plate on being developed shows a picture of the wood. In some cases the spring wood is active and the summer wood without effect while in other cases the reverse is true. It was not found possible to utilize this action to identify woods, to recognize kiln dried or drastically heated timber, to determine the amount of moisture, or to detect incipient decay.—*W. P. Thompson.*

MORPHOLOGY AND TAXONOMY OF ALGAE

E. N. TRANSEAU, *Editor*L. H. TIFFANY, *Assistant Editor*

(See also in this issue Entries 2230, 2238, 2265, 2288, 2292, 2841, 3020, 3193)

2640. ANONYMOUS. Note. *Nature* 106: 739. 1921.—Note on algae and other plants in Birmingham reservoir.—O. A. Stevens.

2641. CHODAT, R. Algues de la region du Grand St-Bernard. *Bull. Soc. Bot. Genève* 12: 293-305. *Fig. 1-10*. 1920.—The new genera and species of algae described and figured include: *Chlamydomonas cylindrica*, *C. bernardienensis*, *C. pteromonoides*, *C. polydactyla*, *Chlorogonium bernardinense*, *Lobomonas bernardiensis*, *Cyanospira* n. gen., *C. eugleninearum*, *C. aeruginosa*, *Chrysosphaera* n. gen., *C. bernardinensis*, *Bernardinella* n. gen., *B. bipyramidata*, *Pseudomallomonas* n. gen., and *P. bernardinensis*.—W. H. Emig.

2642. CHODAT, R. Sur un nouveau genre d'algues: genus *Interfilum* Chodat. *Bull. Soc. Bot. Genève* 12: 149. 1920.—An announcement of a new genus of algae which will be described in detail in a later issue of the bulletin.—W. H. Emig.

2643. CORTI, EGIDIO. Il lago del Segrino. Note di biologia lacustre. [Lake Segrino. Note on lacustrine biology.] *Nuova Notarisia* 31: 161-166. 1920.—Notes are given on the plant and animal life of an Italian lake at an elevation of 374 m. above the sea. Brief lists of Spermatophyta, Musci, Pisces, Mollusca, and Insecta are followed by somewhat longer lists of the phytoplankton and zooplankton, including Schizophyceae, Dinoflagellata, Chlorophyceae, Desmidiaceae, Diatomaceae, Copepoda, Phyllopoda, Rotifera, and Rhizopoda.—Marshall A. Howe.

2644. CUNHA, ARISTIDES MARQUES DA, et O. DA FONSECA. Le microplankton des côtes meridionales du Brésil. [The microplankton of the southern coast of Brazil.] *Mem. Inst. Oswaldo Cruz* 10: In Portuguese 104-173; in Translations 78-82. 1918.—A list of 75 species (32 diatoms and the rest flagellate forms) of the microplankton of the southern coast of Brazil, together with notes on localities, is given.—L. H. Tiffany.

2645. DELF, ELLEN MARION, and MARGARET R. MICHELL. The Tyson collection of marine algae. *Ann. Bolus Herb.* 3: 89-119. 1921.—A systematised list is given of marine algae collected by W. Tyson along the shores of the Cape Province and Natal, chiefly from Algoa Bay, the Kowie, the Kei mouth, and the Cape Peninsula.—E. M. Doidge.

2646. EVANS, E. D. Mounting freshwater algae, mosses, etc. *Jour. Quekett Microsc. Club* 14: 225-228. 1921.—Various methods of preserving green plants so as to retain their color are reviewed and the use of zinc acetate in the place of the copper acetate in general use in such preservatives is advocated. Full directions are given.—L. B. Walker.

2647. GARDNER, NATHANIEL LYON. The genus *Fucus* on the Pacific Coast of North America. *Univ. California Publ. Bot.* 10: 1-180. *Pl. 1-60*. 1922.—The author discusses first the various possibilities of treatment of the variations in form and structure found among the members of the genus *Fucus*, particularly of those occurring on the Pacific Coast of North America. He announces the discovery of new structures, "caecostomata," or cryptostomata which never open, and discusses their relative importance in classification. On the basis of this discussion he arranges the members of the genus *Fucus* of the Pacific coast of North America under 5 major species, containing respectively 13, 0, 5, 6, and 21 forms. Practically all of the 45 forms are illustrated by photographs. The following are proposed as new: *f. typicus*, *f. angustus*, *f. linearis*, *f. abbreviatus*, *f. cornutus*, *f. nigricans*, *f. elongatus*, *f. luxu-*

rians, f. *reflexus*, f. *rigidus*, f. *latifrons*, f. *contortus*, and f. *variabilis* under *Fucus furcatus* Ag.; *Fucus nitens*; f. *hesperius*, f. *divergens*, f. *costatus*, f. *acutus*, f. *divaricatus* under *Fucus edentatus* De la Pyl.; f. *abbreviatus*, f. *acuminatus*, f. *obtusus*, f. *typicus*, f. *limitatus*, and f. *latissimus* under *Fucus membranaceus*; and f. *cuneatus*, f. *ecostatus*, f. *oregonensis*, f. *marginatus*, f. *flabellatus*, f. *intermedius*, f. *magnificus*, and f. *stellatus* under *Fucus evanescens* Ag.—W. A. Setchell.

2648. GROVES, J. Charophyta from Annam and Guam. Philippine Jour. Sci. 19: 663-664. 1921.—Critical notes on 2 species of *Nitella* and 2 of *Chara* are given; no new names appear.—E. D. Merrill.

2649. HARRIS, G. T. The desmid flora of a triassic district. Jour. Quekett Microsc. Club 14: 137-162. 1920.—The collecting regions are described and 429 species listed.—L. B. Walker.

2650. HARTMAN, M. VON. Ergebnisse und Probleme der Protistenkunde. In: Festschr. K. Wilhelm Ges. zur Förderung der Wissenschaften zu ihrem zehnjährigen Jubiläum dargebracht von ihren Instituten. Julius Springer: Berlin, 1921.

2651. HUSTEDT, FRIEDRICH. Zellpflanzen Ostafrikas, von Bruno Schröder: VI. Bacillariales. [The Algae of East Africa, by Bruno Schröder: VI. Bacillarieae.] Hedwigia 63: 117-160. Fig. 1-25. 1921.—A general and a systematic account is given of the Diatoms of East Africa as shown by an examination of 38 samples collected in various habitats from 5 districts along the coast. Some samples contained numerous forms and others few, thus giving some indication of the abundance and geographical distribution of Diatoms in this region. There were identified from the 38 samples 248 forms, representing 41 genera and 190 species. Seven species and 5 varieties are described as new, as follows: *Achnanthes subhudsoni*, *A. exigua* Grün. var. *constricta*, *Caloneis aequatoriales*, *C. aequatoriales* var. *capitata*, *Neidium inconspicuum*, *Pinnularia amaniensis*, *Navicula kwamkuji*, *Amphora Schroederi*, *Nitzschia Goetzeana* O. Müll. var. *gracilior*, *N. lacustris*, *Hantzschia amphioxys* (Ehr.) Grün. var. *africana*, *H. amphioxys* (Ehr.) Grün. var. *distincte-punctata*.—L. H. Tiffany.

2652. LEWIS, I. F., and W. R. TAYLOR. Notes from the Woods Hole laboratory,—1921. Rhodora 23: 249-256. Pl. 133, fig. 1-2. 1921.—Notes are presented on observations on the morphology and taxonomy of *Platymonas subcordiformis* (Wille) Hazen. Also observations made on the following algae are briefly recounted: *Asterococcus superbus* (Cienk.) Scherf., *Anabaena spiroides* var. *crassa* Lemm., *Bryopsis hypnoides* Lamx., *Ectocarpus Mitchellae* Harv. var. *parva* n. var. The junior author adds also a note in regard to the introduction of *Baptisia bracteata* (Muhl.) Ell. into the Woods Hole region. This species is indigenous only as far as Michigan and this seems to be the 1st record of its occurrence in New England.—James P. Poole.

2653. LITTLE, H. P. What do you know about diatoms? Sci. Amer. Monthly 4: 77-78. 1922.

2654. LUTZ, ADOLPHO, H. C. DE SOUZA ARDUJO, and O. DA FONSECA. Report on the journey from the river Paraná to Assuncion and the return journey over Buenos Aires, Montevideo, and Rio Grande. Mem. Inst. Oswaldo Cruz 10: In Portuguese 99-103; in Translations 83-102. 56 pl. 1918.—The major discussion is zoological and climatological. A list of 59 species of flagellates and diatoms collected from the coast of Uruguay up to the state of Santa Catharina is given. Some notes appear on the nature of the vegetation seen along the shores of the Upper Paraná River.—L. H. Tiffany.

2655. MAZZA, ANGELO. Aggiunte al saggio di algologia oceanica. [Appendix to the essay on oceanic algology.] Nuova Notarisia 31: 1-64. 93-160. 1920.—The author continues his

studies of Florideae supplementary to his *Saggio di Algologia Oceanica*, published serially in *Nuova Notarisia* from 1905 to 1918. The species particularly described or discussed are; *Acanthopeltis japonica*, *Hennedya crispa*, *Iridaea latissima*, *Besapapillaeformis*, *Gigartina tristis*, *G. brachiata*, *G. clavifera*, *G. angulata*, *G. alveata*, *G. ancistroclada*, *G. tuberculosa*, *G. cincinnalis*, *G. mamillata*, *G. Radula*, *G. Burmannii*, *G. atropurpurea*, *G. insignis*, *G. Chamissoi*, *Gymnogongrus furcellatus*, *G. disciplinalis*, *G. glomeratus*, *G. crenulatus*, *G. vermicularis*, *G. Turqueti*, *Stenogramma interruptum*, *Mychodea terminalis*, *M. carnosa*, *M. pusilla*, *Callophyllis discigera*, *C. calliblepharoides*, *C. Hombrovianna*, *Microcoelia chilensis*, *Ectophora depressa*, *Polysiphonia fastigiata*, *P. laciniata*, *Callymenia cribrosa*, *C. schizophylla*, *C. antarctica*, *C. oblongifruca*, *Turnerella Mertensiana*, *T. Pennyi*, *Meristotheca Duchassaingii*, *M. Fergussonii*, *Anatheca Montagnei*, *A. furcata*, *Craspedocarpus erosus*, *Gloiophyllis Barkeriae*, *Rhodophyllis acanthocarpa*, and *R. membranacea*.—Marshall A. Howe.

2656. OYE, PAUL VAN. *Kurzer Beitrag zur Kenntnis von Pithophora sumatrana* (Mart.) Wittr. [A short contribution to a knowledge of *Pithophora sumatrana*.] *Hedwigia* 63: 43–47. Fig. 1–2. 1921.—Seen frequently in 1917, in the region about Batavia, Java, this peculiar alga attracted attention, which led to an investigation of its life-history. The study was based on fresh material collected in November and December, and careful measurements were made of the diameter of the main filaments and the branches. The main filament varied from 48 to 77 μ against 105 to 150 μ given by Wittrock, 100 to 140 μ given by Möbius, and 85 to 140 μ given by Ernst. Oye's material was found in ditches near the coast where the water was usually salty, giving somewhat unusual life conditions. Taking his measurements with those of others, he concludes that the main axes vary in diameter from 48 to 140 μ . Twelve species from the genus vary from 65 to 175 μ , and the one species shows thus almost as much variation in diameter of the filaments as all of the species. Therefore, size of filaments cannot serve as diagnostic characters for the species.—The akinetes were found to be intercalary more commonly. Yet terminal akinetes were not rare, and the terminal cell seemed quite as likely to become differentiated into an akinete as any other single cell of the filament. Indeed, nearly all mature filaments showed terminal akinetes. The numbers of terminal and intercalary akinetes were 14 and 46 respectively in 10 specimens examined. The earlier-formed akinetes are intercalary, and it may be that in 2 filaments in which terminal akinetes were lacking this was due to immaturity of the filaments.—From his own observations and those of others, he believes that the species develops during 2 periods for each year in the East Indian lowlands. The periods are March and April, and October, November, and December.—Bruce Fink.

2657. P[ARTHASARATHY IYENGAR], M. O. [Rev. of: HODGETTS, WILLIAM J. A new species of *Spirogyra*. *Ann. Botany* 34: 519–524. 1920 (see Bot. Absts. 8, Entry 1233).] *Jour. Indian Bot.* 2: 322. 1921.

2658. SISMEY, E. D. A contribution to the algal flora of the Okanagan (British Columbia). *Canadian Field Nat.* 35: 112–114. 1921.—The list of 65 species of algae collected in one of the Canadian rivers includes 21 species of Myxophyceae, 41 of Chlorophyceae, and 3 of Phaeophyceae.—W. H. Emig.

MORPHOLOGY AND TAXONOMY OF BRYOPHYTES

A. W. EVANS, *Editor*

(See also in this issue Entries 2228, 2229, 2230, 2231, 2238, 2245, 2270, 2275, 2276, 2289, 2293, 2298, 2308, 2309, 2643, 3261)

2659. AMANN, J. L'indice cellulaire chez les Muscinées. [The cellular index in bryophytes.] *Rev. Bryologique* 48: 33–38. 1921.—The author emphasizes the fact that cell-measurements are often of importance in distinguishing between closely related species of

bryophytes. Measurements of leaf cells are most frequently employed for this purpose, both the length and the width of the cells being usually given. Amann recommends, instead of this method, the use of the "cellular index," which signifies the average number of cells per square millimeter of surface. He gives definite directions for determining this index and then illustrates its value by tabulating, as concrete examples, the cellular indices of 2 closely related species of *Fissidens* and of the 25 European species of *Mnium*. In certain species hygrophilous and xerophilous races occur, in which the indices differ somewhat, but in most cases the values are fairly uniform. The cellular index may be determined for other organs than leaves, such as the exothecium of the capsule, but the distinctions thus obtained are rarely of much constancy. [See also Bot. Absts. 11, Entry 460.]-A. W. Evans.

2660. DIXON, H. N. *Rhacopilopsis trinitensis* E. G. Britt. & Dixon. Jour. Botany 60: 86-88. 1922.—The author discusses various critical opinions regarding this widely distributed moss, which is known from numerous localities in tropical America and Africa. The name applied to it represents a new combination, the oldest name for the species being *Hypnum trinitense* C. M. (1851). At the close of the paper a full synonymy is given.—Adele Lewis Grant.

2661. DOPOSCHEG-UHLÁR, JOSEF. Versuche über die Umwandlung von Antheridienständen in den vegetativen Thallus bei Marchantieen. [Experiments dealing with the transformation of antheridial receptacles of the Marchantieae into vegetative thalli.] Flora 113: 191-198. Pl. 7, 3 fig. 1920.—Experiments were carried on with the male receptacles of *Marchantia planiloba* Steph., *M. palmata* Nees, and the common *M. polymorpha* L. in the attempt to induce a resumption of growth in the branches or lobes. The most interesting results were obtained with *M. planiloba*, an African species in which the lobes are unusually long. When the receptacles were cut off and placed with the lower surface of the disc in contact with moist peaty earth, the lobes began to elongate at their apices. In some cases a succession of new antheridia was developed; in other cases the prolongations of the lobes were vegetative in character, producing cupules of the ordinary type; in still other cases structures intermediate between the antheridial cavities and cupules were formed before normal vegetative growth was finally resumed. The author attributes the renewal of growth to the removal of an inhibitory stimulus and associates the various types of development with the formation of rhizoids in greater or less number, various nutritive conditions being thus brought about. In the case of *M. palmata*, an Asiatic species, the lobes could be induced to continue the formation of antheridia but not to revert to a vegetative condition; in *M. polymorpha* no renewal of growth could be secured.—A. W. Evans.

2662. EVANS, ALEXANDER W. Notes on New England Hepaticae,—XVI. Rhodora 23: 281-284. 1921.—The following 2 additions to the flora of New England are discussed: *Nardia fossombronioides* (Aust.) Lindb., found in Connecticut, an extension of range north from New Jersey; and *Scapania hyperborea* Jörgensen, found in the mountains of Maine and New Hampshire, these being the first North American stations south of Greenland. Other additions to the Maine flora are *Lunularia cruciata*, *Calypogeia fissa*, *C. Sullivantii*, *Cephaloziella bifida*, *Radula obconica*, and *Scapania paludosa*. Additions to the Vermont flora are *Fossombronia foveolata*, *Cephaloziella bifida*, *Nardia obovata*, *Plagiochila Austini*, and *Anthoceros crispulus*.—M. L. Fernald.

2663. EVANS, WILLIAM. Some moss records from St. Kilda. Trans. Bot. Soc. Edinburgh 23: 67-69. 1921.—The author lists 32 species of mosses from St. Kilda, an island of the Hebrides group, the list being largely based on specimens collected by J. Waterston and W. E. Clarke. Three of the species are not cited from the vice-county of the Outer Hebrides in the 1907 "Census" of British mosses.—R. S. Ferris.

2664. GIBBS, S. S. The genus *Calobryum*. Jour. Botany 58: 275. 1920.—Attention is called to the fact that the genus *Calobryum* contains 4 species instead of 3, as stated by Camp-

bell in a paper recently published [see Bot. Absts. 8, Entry 446]. The 4th species is *C. Gibbsiae* Steph. of New Zealand.—A. W. Evans.

2665. GYÖRFFY, ISTVÁN. *Miscellanea bryologica Hungarica. I—V.* [Miscellanea on Hungarian bryology.] Bot. Közlemenyek 19: 7-16, (1)-(2). 18 fig. 1920.—The author contributes 5 notes on Hungarian bryophytes. In the 1st he reports the fungus *Cladosporium herbarum* in the capsules of 6 different species of mosses. In the 2nd he notes the occurrence of *Saelania caesia* at the unusual elevation of 2000 m. and describes a filamentous waxy excretion of the leaves. In the 3rd, 4th, and 5th he cites new Hungarian stations for *Sphaerocephalus turgidus*, *Conostomum tetragonum*, and *Bucegia romanica*, respectively, describing in the case of the last species the marginal portion of the thallus. The figures illustrate capsules affected by the *Cladosporium*, the waxy secretion of the *Saelania*, and the marginal cells of the *Bucegia*. The article is written in Hungarian but has a German résumé, from which the present abstract has been prepared.—A. W. Evans.

2666. HERZFELDER, HELENE. *Experimente an Sporophyten von Funaria hygrometrica.* [Experiments on sporophytes of *Funaria hygrometrica*.] Flora 114: 385-393. 3 fig. 1921.—In the described experiments the calyptras were removed from sporophytes of *Funaria hygrometrica* in various stages of development. An enlargement of the seta was thus induced, and the capsules formed tended to be erect and more or less radial. In one case an abnormal development of the archesporium was observed, a layer of sporogenous tissue extending across the upper part of the columella.—A. W. Evans.

2667. IRMSCHER, E. *Neue Fissidens-Arten aus Brasilien und Bolivien.* [New species of *Fissidens* from Brazil and Bolivia.] Notizbl. Bot. Gart. u. Mus. Berlin 7: 533-537. 1921.—The following new species of *Fissidens*, all from the collections of E. Ule, are described: *F. acreanus*, *F. Georgianus*, *F. hylophilus*, and *F. surumuensis* from Brazil; *F. Ernestii* and *F. terricola* from Bolivia.—H. A. Gleason.

2668. KRAUSE, ERNST H. L. *Rostocker Moosflora: Verzeichnis der bis 1920 aus der Nordostecke Mecklenburgs bis Bukspitze, Warnow, Güstrow, Sülze bekannt gewordenen Moosarten.* [Moss flora of Rostock: enumeration of the species of bryophytes reported up to 1920 from the northeastern corner of Mecklenburg as far as Bukspitze, Warnow, Güstrow and Sülze.] 8 vo., 16 p. Rostock, 1920.—In the introduction the author indicates the collections upon which his report is based, gives a list of abbreviations and tabulates the 34 genera that he recognizes. He then enumerates the bryophytes from the portion of Mecklenburg bounded roughly by the 4 localities mentioned in the subtitle. Under each species data regarding stations are recorded, together with occasional critical remarks. The list includes 302 species, of which 15 are peat mosses, 231 true mosses, and 56 hepatics. Under certain species 1 or more subspecies or species of a secondary rank are cited. The genera are understood in a very broad sense; the genus *Jungermannia*, for example, includes the order Jungermanniales of most recent writers, while *Hypnum* is made up of the Linnaean genus *Hypnum*, together with *Bryum* and several other genera. This procedure has necessitated the formation of several new combinations, but these are difficult to distinguish, owing to the omission of synonyms and of authors' names after the species.—A. W. Evans.

2669. KRAUSE, ERNST H. L. *Rostocker Moosflora: Nachträge bis Ende des Jahres 1921.* [Moss flora of Rostock: additions up to the close of the year 1921.] 8 vo., 4 p. Rostock, 1921.—[See preceding entry.] In this supplement to the Moss flora of Rostock the author adds 5 peat mosses, 15 true mosses, and 11 hepatics and gives further data regarding some of the species in his original article. He now understands *Hypnum* in a somewhat narrower sense, *Bryum* being separated as a distinct genus, and again forms a number of new combinations.—A. W. Evans.

2670. MALTA, N. *Versuche über die Widerstandsfähigkeit der Moose gegen Austrocknung.* [Investigation of the resistance of mosses to desiccation.] Latvijas Augstskolas

Raksti [Acta Univ. Latviensis] 1: 125-129. Fig. 1-5. 1921.—Many xerophilous mosses, especially Grimmiaceae, possess living cells even after many months in the herbarium. Material of many species was taken from herbarium specimens, placed in Erlenmeyer flasks of nutrient solution, and left standing in the laboratory window. Many cases of renewed growth were observed, though negative results are not conclusive owing to lack of data upon method of drying the specimens for the herbarium. Irmscher's conclusion that dormant buds rather than apical cells regenerate is in the main true, but in 2 cases apical cells showed renewed growth, one even after 4 years in the herbarium. Renewed growth seems to occur more readily in summer. The new growth may be in the form of rhizoids which develop brood bodies, secondary protonema, or actual vegetative shoots. Some stems of *Anoetangium compactum* developed rhizoids and chloronema even after 19 years in the herbarium. Other mosses, notably *Amblystegium compactum*, show ready germination of brood cells after desiccation. Spores of mosses show the greatest resistance to drought; those of *Grimmia pulvinata* germinated after remaining almost 70 years in the herbarium. A bibliography of 5 titles is given.—E. B. Chamberlain.

2671. MALTA, N. Zur Verbreitung von *Zygodon conoideus* (Dicks.) Hook. et Tayl. [On the distribution of *Zygodon conoideus*.] Latvijas Augstskolas Raksti [Acta Univ. Latviensis] 2: 97-102. 1 pl., 2 fig. 1922.—The author shows that *Zygodon conoideus* is essentially an Atlantic species, its known range extending along the coast from Norway to Spain. He reports new stations for the species in Denmark and East Friesland and confirms the old reports for Schleswig made by T. Jensen and Prahl. In distinguishing *Z. conoideus* from other members of the genus and particularly from the closely related *Z. viridissimus*, he emphasizes the importance of characters derived from the gemmae and illustrates their distinctive features on the accompanying colored plate. At the close of the article a short résumé in Lettish is appended.—A. W. Evans.

2672. MÜLLER, FR. Zur Moosflora der oberen Nahetals. [On the moss flora of the upper valley of the Nahe.] Sitzungsber. Naturhist. Ver. Preussisch. Rheinlande u. Westfalens 1917/1919: 318-335. 1919.—The author gives a report on the bryophytes of the upper valley of the Nahe, the district studied being in the southwestern part of Germany between the Rhine and the Mosel. After a brief summary of the literature and an account of the geological and physiographic features of the region, he lists 228 true mosses, 13 peat mosses, and 51 hepatics. Except in the case of common and widely distributed species full data regarding stations are given, and these are sometimes supplemented by critical remarks.—A. W. Evans.

2673. NICHOLSON, W. E. Bryological notes from Sicily. Rev. Bryologique 48: 38-43. 1921.—The author gives an account of a bryological excursion to Sicily which he made in the spring of 1914 in company with H. N. Dixon. After describing the botanical features of the places visited, with special reference to the bryophytes, he gives a list of the species collected, numbering 48 mosses and 16 hepatics. The species are accompanied by full data regarding localities and, in several cases, by critical remarks. No new species or combinations are proposed, but *Bryum siculum* Roth is reduced to synonymy under *B. splachnoides* (Harv.) C. M.—A. W. Evans.

2674. NICHOLSON, W. E. *Riccia Crozalsii* Lev. in West Cornwall: a correction. Jour. Botany 56: 360. 1918.—It is shown that a published record for *Riccia Warnstorffii* Limpr. from the Lizard, West Cornwall, England [see Jour. Botany 55: 10. 1917], was based on material of the closely related *R. Crozalsii*, and directions are given for distinguishing the 2 species.—A. W. Evans.

2675. PEARSON, WM. HY. *Pedinophyllum interruptum* (Nees) Lindberg. Jour. Botany 56: 57. 1918.—The author shows that a published record for *Pedinophyllum interruptum* from Ardingly Rocks, Sussex, England, was based on a specimen of *Plagiochila asplenioides*.—A. W. Evans.

2676. PEARSON, WM. HY. *Pedinophyllum pryenaicum* (Spruce) Lindb. Jour. Botany 56: 233-235. 1918.—Although *Pedinophyllum pyrenaicum* is usually regarded as a form or variety of *P. interruptum* (Nees) Lindb., the author emphasizes its distinctive features and suggests that it ought perhaps to be considered a valid species.—A. W. Evans.

2677. SHERRIN, W. R. The lamellae of *Polytrichum*. Jour. Botany 56: 105-107. 22 fig. 1918.—The importance of the leaf-lamellae in distinguishing species of *Polytrichum* is emphasized, and the use of surface-views as well as cross-sections is recommended. On the basis of surface-views the author gives a key to the 4 groups of species represented in the British Isles, extending this key to the individual species in the case of 2 groups. The figures represent the lamellae of the British species.—A. W. Evans.

2678. WHELDON, J. A. Key to the harpidioid Hypna. Naturalist 1921: 17-20, 245-248, 343-346. 1921; 1922: 13-16, 103-108. 1922.—The author gives a key for the determination of the polymorphous group of mosses known as the harpidioid *Hypna*, in which he considers not only the species and subspecies represented but also the varieties and forms. He recognizes 28 species in all, divided into the following genera: *Cratoneuron* (1), *Drepanocladus* (12), *Limprichtia* (5), *Sanionia* (3), *Scorpidium* (2), and *Warnstorfia* (5). Although no new species are proposed a number of new subspecies, varieties and forms are indicated, and the treatment adopted necessitates a large number of new combinations. Those of a specific nature are the following: *Cratoneuron glaucum* (Lam.), *Drepanocladus asturicus* (Ren.), *D. Barbeyi* (Ren. & Card.), *D. Flageyi* (Ren.), *Limprichtia latinerve* (Warnst.), *L. pellucida* (Wils.), *Sanionia symmetrica* (Ren. & Card.), *Scorpidium turgescens* (Jens.), *Warnstorfia Rotae* (DeNot.), *W. serrata* (Lindb.), and *W. stenophylla* (Wils.). With rare exceptions these species were originally referred to the genus *Hypnum*.—A. W. Evans.

MORPHOLOGY AND TAXONOMY OF FUNGI, LICHENS, BACTERIA, AND MYXOMYCETES

H. M. FITZPATRICK, *Editor*

(See also in this issue Entries 2210, 2213, 2222, 2227, 2230, 2241, 2245, 2309, 2459, 2460, 2467, 2564, 2665, 2974, 2975, 3022, 3023, 3062, 3066, 3067, 3080, 3084, 3089, 3104, 3193, 3265, and those in the section Pathology)

FUNGI

2679. ANONYMOUS. Index to American mycological literature. Mycologia 13: 351-355. 1921.

2680. ANONYMOUS. Index to American mycological literature. Mycologia 14: 53-54. 1922.

2681. ANONYMOUS. Pathological herbarium notes 1. 9 p. U. S. Dept. Agric. Bur. Plant Indust. Office Path. Collections: Washington, D. C., 1920.—In order to furnish to those interested recent and complete information respecting accessions of diseased plants and fungi by the herbarium, notes will be issued at such intervals as the nature of the accessions necessitates. In the first note the fungi exsiccati represented in the herbarium are listed, and the existence of certain other special collections is indicated.—H. M. Fitzpatrick.

2682. ANONYMOUS. Pathological herbarium notes 2. 15 p. U. S. Dept. Agric. Bur. Plant Indust. Office Path. Collections: Washington, D. C., 1921.—A discussion of the term "type" and other related terms as used in the herbarium is given. New exsiccati accessions are listed. A large number of fungi are listed as "noteworthy specimens." These are chiefly new to the herbarium.—H. M. Fitzpatrick.

2683. ANONYMOUS. Pathological herbarium notes 3. 11 p. U. S. Dept. Agric. Bur. Plant Indust. Office Path. Collections: Washington, D. C., 1922.—The number is limited to the consideration of specimens received from the Philippine Bureau of Science.—H. M. Fitzpatrick.

2684. ANONYMOUS. Pathological herbarium notes 4. 13 p. U. S. Dept. Agric. Bur. Plant Indust. Office Path. Collections: Washington, D. C., 1922.—New exsiccati accessions are listed and noteworthy insertions in the herbarium are given. Observations are made on certain specimens.—H. M. Fitzpatrick.

2685. ADAMS, J. F. Observations on the spores of *Schizophyllum commune*. *Torreyia* 21: 98-100. 1 fig. 1921.—Although this fungus is classified with the white-spored agarics, the writer has previously shown [see Bot. Absts. 2, Entry 281] that the spores in mass are pink or salmon-colored. This observation is further supported by prints made on black glazed paper under bell-jars at room temperature. Sporophores collected in January and February in a frozen condition supply the most favorable material, heavy prints being secured in 12-24 hours. Material collected in March is less favorable. Gradual drying provides the condition most favorable for spore-discharge.—J. C. Nelson.

2686. ARTHUR, J. C. Uredinales collected by Fred J. Seaver in Trinidad. *Mycologia* 14: 12-24. 1922.—A list of 71 rusts is given including the following: *Prospodium suppressum* sp. nov. on *Tabebuia* sp., *Puccinia* (?) *ignava* comb. nov. on *Bambos* sp., *P. Seaveriana* sp. nov. on *Oliganthes condensatus*, *P. solanita* (Schw.) comb. nov. on *Solanum* sp., *Aecidium Alibertiae* sp. nov. on *Alibertia* sp., and *A. delicatum* sp. nov. on *Eucharis* sp.—H. R. Rosen.

2687. BATAILLE, F. Note sur deux champignons décrits par M. de Jussieu. [Two fungi described by Jussieu.] *Bull. Trimest. Soc. Mycol. France* 37: 68-69. 1921.—These fungi, described in 1728 in the *Mémoires de l'Académie royale des Sciences* are identified as follows: the first, "*Boleto-Lichen vulgaris*" is *Helvella crispa* Fr. (= *H. pallida* Schaef.), the second, "*Fungus minor, Allii odore*" is *Marasmius prasiosmus* Fr. (= *Ag. alliaceus* Bull.). The original text of these descriptions is given.—D. S. Welch.

2688. BOIS, D. Bois phosphorescents. [Phosphorescent woods.] *Jour. Soc. Nation. Hort. France* 21: 392-395. 1920.—A discussion is given of the causes of phosphorescence and a list of species of fungi which are supposed to be responsible for phosphorescence. Geographical distribution of these species of fungi is given.—H. C. Thomson.

2689. BOSE, S. R. Records of Agaricaceae from Bengal. *Jour. Asiatic Soc. Bengal* 16: 347-353. Pl. 18. 1921.—Descriptive notes are given on 12 species, most of which are figured. No new names appear.—E. D. Merrill.

2690. BOURDOT, H., et A. GALZIN. Hyménomycètes de France (VII. *Stereum*). [Hymenomycetes of France.] *Bull. Trimest. Soc. Mycol. France* 37: 103-112. 1921.—A description and discussion of the genus *Stereum* is given with an analytical key separating 27 species. In addition the following species are described in detail: *S. hirsutum* (Willd.) Pers.; *S. sulphuratum* Berk. et. Rav.; *S. insignitum* Quel.; *S. sanguinolentum* (A. & S.) Fr.; *S. gausapatum* Fr.; *S. rugosum* Pers.; *S. subpileatum* Berk. et Curt.—D. S. Welch.

2691. BREBINAUD, P. Au sujet de quelques champignons d'été. Le Bolet livide est comestible. [A few summer fungi. *Boletus lividus* is edible.] *Bull. Trimest. Soc. Mycol. France* 37: 53-56. 1921.—The author records an abundant collection of the rare *Boletus lividus* and states that it may be safely eaten. A short account of other edible forms found in summer is given.—D. S. Welch.

2692. CARPENTER, C. W. Morphological studies of the *Pythium*-like fungi associated with root rot in Hawaii. *Exp. Sta. Hawaiian Sugar Planters' Assoc. Bot. Ser. Bull.* 3: 59-65.

Pl. 16-23. 1921.—The Pythium-like fungus previously reported (Hawaii Agric. Exp. Sta. Press Bull. 54) as an active factor in the root-rot disease of cane (Lahaina disease) is morphologically identical with *Rheosporangium aphanodermatus* Edson and *Pythium Butleri* Subramaniam. The Pythium-like fungus previously reported as associated with the root rot of pineapples (wilt) and rice is similar in its morphology to the cane Pythium. A taro rot fungus previously reported as like Pythium has been found to be a conidium-producing Pythium. The writer considers that the cane fungus manifests a type of diplanetism in the asexual stage allied to that in the conidium-producing Pythiums, and prefers to classify it in the genus *Pythium* rather than in Edson's new genus *Rheosporangium*.—J. M. Westgate.

2693. CHARDON, CARLOS E. A contribution to our knowledge of the Pyrenomycetes of Porto Rico. *Mycologia* 13: 279-300. Pl. 13-15, fig. 1-4. 1921.—Based on collections made by the writer as well as on collections made by others, some 26 species are described including the following: *Lembosia microspora* sp. nov. on *Ocotea leucoxydon*; *Ophionectria portoricensis* sp. nov. on a log; *Podostroma orbiculare* sp. nov. on a decaying log; *Dothichloe subnodosa* sp. nov. on *Ichnanthus pallens*; *Dothidina peribebuyensis* (Speg.) comb. nov. on species of *Heterotrichum*, *Miconia*, and *Tetrazygia*; *Trabutia Bucidae* sp. nov. on *Bucida buceras*; *Trabutia Guazumae* sp. nov. on *Guazuma ulmifolia*; *Trabutia conica* sp. nov. on *Drepanocarpus lunatus*; *Phyllachora Serjaniicola* sp. nov. on *Serjania polyphylla*, and *Phyllachora Whetzellii* sp. nov. on *Eugenia* sp.—H. R. Rosen.

2694. CHENANTAIS, J. E. Notules mycologiques. [Brief mycological notes.] Bull. Trimest. Soc. Mycol. France 37: 61-67. Pl. 9. 1921.—I. Odyssey of a Berlesiella. Attempts to identify a specimen sent to the author by the late abbé Flageolet led to the working out of the problems relating to the genus in question. Following a discussion the author gives the present status of the genus *Berlesiella* as follows: *B. setosa* Wint; *B. setosa* var. *hispida* Morg.; *B. nigerrima* Blox. = *B. setosa* E. et E. = *B. parasitica* Fab.; *B. nigerrima* var. *hirtella* Bacc. et Av. II. *Gonytrichum caesium* Nees. This form appears to be the conidial stage of *Eriosphæria*.—D. S. Welch.

2695. COUPIN, HENRI. La saveur des champignons. [The flavor of mushrooms.] La Nature 1922: 139. 1922.—More general reference to taste of the flesh of mushrooms in descriptive work is advocated.—H. M. Fitzpatrick.

2696. CUNNINGHAM, G. H. A note recording the presence in New Zealand of the perithecial stages of apple and pear black spot. New Zealand Jour. Agric. 23: 219-221. 1 fig. 1921.—Leaves showing perithecia have been secured from various districts. The perithecia develop best on leaves lying in sheltered places. The method of spore discharge is receiving detailed study. A paper dealing with life-history details will be published later.—N. J. Giddings.

2697. DAVIS, J. J. [Note under "Notes and Brief Articles."] *Mycologia* 14: 46. 1922.—Infection experiments indicate that *Pucciniastrum arcticum* (Lagh.) Tranz. and *P. americanum* (Farl.) Arth. are distinct.—H. R. Rosen.

2698. DURAND, ELIAS J. The genus *Catinella*. Bull. Torrey Bot. Club 49: 15-21. 1922.—A characterization of the genus is given and the following new combinations are published: *Catinella nigro-olivacea* (Schw.) Durand and *C. elastica* (Pat. & Gail.) Durand.—P. A. Munz.

2699. FINK, BRUCE. An addition to the distribution of a rare fungus. *Mycologia* 14: 49-50. 1922.—*Tylostoma verrucosum* is reported from the vicinity of Oxford, Ohio.—H. R. Rosen.

2700. FINK, BRUCE, and SYLVIA C. FUSON. An arrangement of the Ascomycetes of Indiana. Proc. Indiana Acad. Sci. 1919: 113-133. 1921.—The authors present a classification of all the ascomycetes previously published for the state of Indiana. The list comprises 372 species from 38 counties.—F. C. Anderson.

2701. FITZPATRICK, H. M., H. E. THOMAS, and R. S. KIRBY. The *Ophiobolus* causing take-all of wheat. *Mycologia* 14: 30-37. Pl. 10., fig. 1. 1922.—Material of the take-all fungus collected in New York compared with material from England, France, Italy, and Japan shows the fungus to be everywhere the same. McAlpine finds the American fungus agrees with the Australian. The authors conclude that Saccardo's description of *Ophiobolus graminis* and Berlese's figures made from the type collection indicate that the American fungus is this species. Berlese's conclusion that *O. graminis* is the same as *Sphaeria eucrypta* and *S. cariceti* is called to attention. Comparison of the take-all fungus with the type and other materials of *S. cariceti* lead to the conclusion that the 2 are the same, and the name *Ophiobolus cariceti* is accepted for the species. A technical description of the fungus is given. Berlese's statement that *Sphaeria eucrypta* and *S. cariceti* are identical is not sustained. The species *Ophiobolus herpotrichus* is shown to differ strikingly from *O. cariceti* in possessing brown spores twice as long as those of the take-all organism.—H. R. Rosen.

2702. GRAFF, PAUL W. Philippine Basidiomycetes. IV. Bull. Torrey Bot. Club 48: 285-295. 1921.—Distributional notes are given for many species. The following new combinations are published: *Ganoderma leptopum* (Pers.), *G. tornatum* var. *subtornatum* (Murr.), *Fomes Merrittii* (Murr.), *Polystictus caperatus* (Berk.), *P. Elmerianus* (Murr.), *P. nigromarginatus* (Schwein.), and *P. Ramosii* (Murr.).—P. A. Munz.

2703. GROVE, W. B. Mycological notes. VI. Jour. Botany 59: 311-315. 1921.—*Uredo murariae* P. Magn. is transferred to *Milesina*, becoming *M. murariae* (Magn.) Grove; and *Hyalopsora Feurichii* Fischer becomes *Milesina Feurichii* (Fischer) Grove. A new genus, *Phyllosticta* aneceph f. *noxiosa* is described as a new form and *P. Sonchi* Sacc. is transferred to the genus *Ascochyta* as *A. Sonchi*.—Adele Lewis Grant.

2704. GROVE, W. B. New and noteworthy fungi. VII. Jour. Botany 60: 14-17, 42-49. 1922.—The author continues his critical discussion of various fungi growing in Great Britain. The following species are described as new: *Phyllosticta Asperulae*, *P. Heucherae*, *Placosphaeria Ulmi*, *Phomopsis Garryae*, *P. Hyperici*, *P. minuscula*, *P. Oleariae*, and *Cytospora Hyperici*. *Phyllosticta aneceph f. noxiosa* is described as a new form and *P. Sonchi* Sacc. is transferred to the genus *Ascochyta* as *A. Sonchi*.—Adele Lewis Grant.

2705. GROVE, W. B. New and noteworthy fungi. VIII. Jour. Botany 60: 81-86. 1922.—This part of the series deals only with species occurring in Great Britain. *Amphorula*, based on a single species, *A. sachalinensis*, is described as a new genus. In addition, the following species, varieties, and forms are described for the first time: *Hendersonia vagans* var. *corni*, *Septoria polaris* var. *scotica*, *S. Polypodii*, and *Camarosporium Pini f. conorum*. *Phlyctaena Jasiones* Bres. is transferred to *Septoria* as *S. Jasiones*, and *Lophodermium melaleucum* DeNot. becomes *Leptothyrium melaleucum*.—Adele Lewis Grant.

2706. GUILLIERMOND, A., et PEJU. Une nouvelle espèce de levure du genre *Debaryomyces*. [A new species of yeast of the genus *Debaromyces*.] Bull. Trimest. Soc. Mycol. France 37: 35-38. Fig. 1-2. 1921.—The new species *Debaryomyces Nadsonii* is described. Cultural characters, morphology, temperature relations, sexual reproduction, and affinities are given.—D. S. Welch.

2707. GWYNNE-VAUGHAN, DAME HELEN. Fungi: Ascomycetes, Ustilaginales, Uredinales. Roy. 8 vo., xi + 232 p. University Press: Cambridge, 1922.

2708. HAENSELER, C. M. Fungi injurious to paints. Ann. Rept. New Jersey Agric. Exp. Sta. 41: 605-607. 1920.—This paper treats of the effects of fungi on painted surfaces, both with reference to discolorations and injuries. These troubles are especially noticeable in greenhouses. The most important organisms listed are *Dematium pullulans* and species of *Alternaria*, *Aspergillus*, *Penicillium*, *Sporotrichum*, *Cladosporium*, and *Phoma*. The writer

discusses the effects of the fungi on different kinds of paints in greenhouse tests and gives a preliminary discussion of laboratory experiments.—*Mel. T. Cook.*

2709. HODGES, R. S. Ringworm of the nails. *Arch. Derm. and Syph.* 4: 1-28. *Fig. 1-12.* 1921.—Sixteen cases of ringworm of the nails are described in this report. A fungus has been found present in every case. The prevalence of the disease in the South [U. S. A.] indicates the ratio of 1 case to each 500 of population, a prevalence 10 times greater than reported among foreign immigrants at Ellis Island. The invasion of the nail seemed to be secondary to an eruption on the hands and feet and dependent on some slight injury. Twelve cultures of fungi were obtained from 13 cases. These fungi could be separated into 3 cultural varieties; 1 variety proved to be a small-spored ectothrix, *Trichophyton (Oospora)*, whereas the 2 other cultural varieties representing 1 species were probably identical with *Trichophyton (Oospora) rubrum* (Bang) Castellani, which is recorded for the 1st time as attacking the nails.—*W. H. Emig.*

2710. HORI, S. Chinese parasitic fungi collected by Ching Yiu Keo. *Ann. Phytopath. Soc. Japan* 14: 66. 1921. [Text in Japanese.]—A list of parasitic fungi collected in China by Ching Yiu Keo in August, 1920, as follows: *Cercospora Punicae* P. Henn. on *Punica Granatum*, *Cercosporina Ipomoeae* (Wint.) Hori on *Pharbitis hederacea*, *C. Nelumbii* Hori on *Nelumbium speciosum*, *Cladosporium Paeoniae* Pass. on *Paeonia Moutan* and *P. albiflora*, *Peronoplasmodium cubensis* (B. et C.) Clinton on *Cucurbita Pepo*, *Peronospora Trifoliorum* DeBy. on *Glycine Soja*, *Pestalozzia Diospyri* Syd. on *Diospyros Kaki*, *P. Puttemansii* P. Henn. on *Thea Sasanqua*, *Piricularia grisea* (Cke.) Sacc. on *Panicum sanguinale*, *P. Oryzae* Brios. et. Cav. on *Oryza sativa*, *Ascochyta hortorum* (Speg.) C. O. Smith on *Solanum Melogena*, *Pseudomonas Malvacearum* E. Sm. on *Gossypium herbaceum*, *Cercospora Hostae* Hori sp. nov. (no description given) on *Hosta Sieboldiana*, *Uromyces appendiculatus* (Pers.) Link. and *Cercospora Vignae* Racib. on *Vigna Catjang*, *Helminthosporium turcicum* Pass. on *Zea Mays*, *Phyllosticta sojaecola* Mass. on *Glycine Soja*.—*Takewo Hemmi.*

2711. JACKSON, H. S. The Uredinales of Indiana. III. *Proc. Indiana Acad. Sci.* 1920: 165-182. 1921.—The article contains a list of unrecorded hosts, corrections for species published in former papers, and descriptions of 12 species new to the state. A host index for the 3 papers is also given. [See also Bot. Absts. 1, Entry 781.]—*F. C. Anderson.*

2712. JACKSON, H. S. The Ustilaginales of Indiana. II. *Proc. Indiana Acad. Sci.* 1920: 157-164. *Fig. 1.* 1921.—This supplement to an earlier article [see Bot. Absts. 1, Entry 780], in which 47 species on as many hosts are recorded for the state, gives additional hosts for the above species and a few corrections; also descriptions of 10 species new to the state. Indices to species and hosts for both papers are included.—*F. C. Anderson.*

2713. KEILIN, D. On a new Saccharomycete *Monosporella unicuspidata* gen. n. nom. n. sp., parasitic in the body cavity of a dipterous larva (*Dasyhelea obscura* Winnertz). *Parasitology* 12: 83-91. *Fig. 1-3.* 1920.—The genus *Monospora* (= *Monosporella*) was founded by Metchnikoff in 1884 to designate a parasitic fungus, *M. bicuspidata*, which he discovered in the body cavity of *Daphnia magna*, where it multiplies actively by budding in a yeast-like manner. Metchnikoff's studies on this parasite afford a striking instance of the phenomenon of phagocytosis. The genus *Monosporella* has comprised Metchnikoff's *M. bicuspidata* and Butchli's yeast-like fungus, the latter not sufficiently described and illustrated to determine more than its generic position. In the summer of 1919 the author found a new species of *Monosporella* to which he gives the name *M. unicuspidata*. The author cites the occurrence of the new fungus, states that "it appears probable that a number of larvae may rid themselves of parasites by phagocytosis," and supports this supposition by certain observations. The fat body seems to be the only organ which is completely destroyed by the parasite. The resistant forms of the latter are set free on decomposition of the larva. A description of the new species of *Monosporella* is given followed by a general discussion of the systematic position of the genus. A

brief reference is made to Peglion's and Hansen's views on classification of Saccharomycetes, the author disagreeing with the latter's view that the 2 genera *Monosporella* and *Nematospora* are "doubtful Saccharomycetes." The Hansen classification, with the few modifications and details added by Lafar, is given, with some details bearing on the genus *Monosporella*. In an appendix reasons are given for changing *Monospora* to *Monosporella*.—C. D. Sherbakoff.

2714. KEISSLER, KARL VON. *Pilze aus Salzburg*. [Fungi from Salzburg.] Beih. Bot. Centralbl. II. 38: 410-430. 1921.—Descriptions are given of new or rare species collected by the author in Salzburg and now in the State Museum at Vienna. The following new species or new combinations are given: *Belonopsis graminea* (*Mollisia graminea* Karst.), *B. pallens* (*Belonium pallens* Sacc.), *Geopyxis Catinus* Sacc. var. *microspora*, *Hendersonia stagonosporioides* Tassi var. *Dianthi* (Bub.) Keissl., *Humaria subhirsuta* var. *rubra* (Rehm) Keissl., *H. subhirsuta* var. *theleboides* (Alb. et Schw. apud Fr.) Keissl., *Melanconium sphaerioides* Lk. f. *apiocarpon* (Lk.) Keissl. et f. *didmoideum* (Vest.) Keissl., *Septoria Orchidearum* West. var. *Listerae*, *Stagonospora compta* (Sacc.) Keissl.—The following were found to be synonyms: *Coniothyrium Dumee* Bri. et Cav. (*C. rhamnigenum* Bub.), *Cordyceps Dittmarii* Quel. (*C. specophila* B. et C.), *Fusarium salicicolum* All. (*F. Salicis* Fuck.), *Gnomonia spermogonioides* Rehm (*G. Rubi* Wint.), *Lachnum flavo-fuligineum* (A. et S.) Rehm (*L. leucophaeum* Karst.), *Lachnea gilva* (Boud.) Sacc. (*L. fimbriata* Sacc.), *Peronospora Knautiae* Fuck. and *P. violacea* Berk. (*P. Dipsaci* Tul.), *Peziza albo-furfuracea* Saut. (*Lachnum clandestinum* Karst.), *Peziza gilva* Boud. (*Lachnum fimbriata*), *Phyllosticta Caraganae* Syd. (*P. Spaethiana* All. et Syd.), *P. Rhamni* West. (*Coniothyrium rhamnigenum* Bub.), *Ramularia hamburgensis* Lindau (*R. filaris* var. *Hieracii* Bauml.), *Septoria Senecionis-silvatici* Syd. (*S. Senecionis* West.).—L. Pace.

2715. KRIEGER, LOUIS C. C. *Schizophyllum commune* with a stipe. *Mycologia* 14: 47-48. 1922.—The fungus, growing from shells of buried chestnuts, produced stipes "just long enough to permit of the formation of the sporophore in the light."—H. R. Rosen.

2716. LENDNER, A. A propos de l'heterothallisme des Coprins. [Concerning heterothallism in *Coprinus*.] Bull. Soc. Bot. Genève 12: 140-141. 1920.

2717. LENDNER, A. A propos de l'heterothallisme des Coprins. [Concerning heterothallism in *Coprinus*.] Bull. Soc. Bot. Genève 12: 337-352. Fig. 1-9. 1920.—By means of pure cultures obtained from single spores, *Coprinus clavatus* Fries is shown to be heterothallic whereas *Coprinus sterquilinus* Fries is homothallic. Individual differences in separate strains were detected.—W. H. Emig.

2718. LIESKE, RUDOLF. *Morphologie und Biologie der Strahlenpilze (Actinomyceten)*. x + 292 p., 4 pl., 112 fig. Gebrüder Borntraeger: Berlin, 1921.

2719. MAINS, E. B. The heteroecism of *Puccinia montanensis*, *P. Koeleriae*, and *P. apocrypta*. *Mycologia* 13: 315-322. Fig. 1-4. 1921.—By sowing telial material of *Puccinia montanensis* on Boraginaceous and Hydrophyllaceous species no infections were obtained. Since field evidence indicated a possible relationship between a rust on the grasses *Agropyron tenerum*, *A. Smithii*, and *Hordeum jubatum* and aecia on *Berberis Fendleri*, sowings of aeciospores from the latter host, collected in Colorado, were made on *Hordeum jubatum* and *Hystrix Hystrix* with infections resulting. Likewise, telia on *Agropyron tenerum*, *A. Smithii*, and *A. sp.* gave infections on *Berberis Fendleri*. It is therefore concluded that the alternate host of *Puccinia montanensis*, a species with broad, thick-walled teliospores and numerous paraphyses in the uredinia, is *Berberis Fendleri*. A morphological study indicates that this rust is distinct from *Puccinia Koeleriae*, which also has aecia on barberry. The *Hydrophyllum* aecia which Arthur had previously connected with a rust on *Agropyron tenerum* and *Elymus virginicus* are now considered to belong to *Puccinia apocrypta* instead of *P. montanensis*, *P. apocrypta* having urediniospores and teliospores which are markedly different from those of *P. montanensis*.—H. R. Rosen.

2720. MAINS, E. B. Unusual rusts on *Nyssa* and *Urticastrum*. Amer. Jour. Bot. 8: 442-451. 6 fig. 1921.—A new genus of rusts, *Aplospora*, belonging to the family Melampso-raceae; and 2 new species, *Aplospora Nyssae* and *Cerothelium Dicentrae*, are here described. The position and relationships of the 2 genera are discussed, considerable prominence being given to the early maturity and germination of teliospores shown by both.—E. W. Sinnott.

2721. MARTIN, CHARLES ED. Adjonction à la florule mycologique Genevoise. [An addition to the mycological flora of Switzerland.] Bull. Soc. Bot. Genève 12: 136. 1920.—*Humaria euchroa* Karsten known from Finland and France is reported for the first time from Switzerland.—W. H. Emig.

2722. MELIN, ELIAS. On the mycorrhizas of *Pinus silvestris* L. and *Picea abies* Karst. A preliminary note. Jour. Ecol. 9: 254-257. 1922.—The mycorrhizas of *Pinus silvestris* and *Picea abies* cause a limited development of rootlets. In the former the dichotomous branching is often modified by the development of nodules as large as peas composed of many densely crowded short branches. Three mycorrhizal fungi have been isolated by the author from the 2 species. They have been called preliminarily *Mycelium radialis silvestris* and *M. radialis abietis*. They are aerobic organisms growing more vigorously in an acid substratum, are exceedingly specialized, and develop slowly. No fixation of nitrogen takes place in pure cultures although there is evidence that the mycorrhizas of *Pinus silvestris* fix free nitrogen. Seeds of both trees germinate without the fungi and the fungi are not disseminated by the seed. The fungi from pure cultures infect sterile seedlings through root hairs and then develop more vigorously. At first the hyphae grow principally in the interior of cortical cells where they form a pseudoparenchyma of the same appearance as in the fungus mantle of the completely developed mycorrhiza. Later the "Hartig tissue" and the fungus mantle are formed.—Geo. D. Fuller.

2723. MURRILL, W. A. A fragrant polypore. Mycologia 14: 46-47. 1922.—*Trametes suaveolens* occurring on poplar (*Populus grandidentata*) as well on willows is reported.—H. R. Rosen.

2724. MURRILL, W. A. *Hygrophorus caprinus*. Mycologia 14: 48-49. 1922.—A collection from Massachusetts is reported and described.—H. R. Rosen.

2725. MURRILL, W. A. Illustrations of fungi-XXXIII. Mycologia 14: 25-29. Pl. 2-8. 1922.—The following fungi are described and illustrated: *Chanterel floccosus* Schw., *Clitocybe phyllophila* (Pers.) Quél., *C. subhirta* Peck, *Melanoleuca Thompsoniana* Murrill, *M. eduriformis* Murrill, *Galerula Hypni* (Batsch) Murrill, *Gymnopilus flavidellus* Murrill, and *Hebeloma luteum* Murrill.—H. R. Rosen.

2726. NEGRI, G. Ricerche sulla biologia di un *Penicillo* patogeno (*Penicillium mycetomagenum* Mant. et Ngr.). [Researches on the biology of a pathogenic *Penicillium*.] Atti R. Accad. Sci. Torino 56: 67-78. 1920.—A study is reported of a black granular mycetoma apparently corresponding with Madura foot observed in a clinic. Granules were removed from the tissues of an amputated foot and placed on glycerine agar and Sabouraud medium; a *Penicillium* developed. The cultural characteristics of the organism are given in considerable detail.—Harriet M. Libby.

2727. NIENBURG, W. Pilze und Flechten. [Fungi and Lichens.] 8 vo., 128 p. B. G. Teubner: Leipzig und Berlin, 1921.

2728. OVEREEM, C. VAN. Mykologische Mitteilungen. Serie I. Ascomyceten. Drittes Stück. Über zwei interessante Discomyceten. [Mycological notes. Series I. Ascomycetes. Third part. Concerning two interesting discomycetes.] Hedwigia 63: 50-57. 1921.—*Discina venosa* (Pers.) Sacc. is considered with respect to European distribution, time of

appearance, and anatomical structure. The subspecies *reticulata* (Grev.) Rehm is regarded as only a better-developed form, reaching a diameter of from several cm. to 1.5 dm. The folding of the hymenium is slight in small specimens, but becomes pronounced in large ones, where it may finally resemble the reticulations of *Morchella*. The color of the hymenium is at first dark ochre-yellow, changing later to a chestnut-brown, or finally to black-brown. The lightest color is seen in parts where the folding is most pronounced. In younger specimens, the stipe is only 1 cm. long, somewhat less in diameter, and largely hypogean, so that the apothecium appears to be sessile. As the hymenium folds, the stipe elongates and becomes *Helvella*-like, reaching 3 cm. in length and 2 cm. in diameter. Various stages of development have been regarded as distinct subspecies or even as species by some workers. As in the *Morchellaceae*, several protoplasmic granules sometimes occur outside the wall at one pole of the spore or at both poles, and these have been overlooked by several workers. The origin of these bodies is unknown, but they appear to be absent in species in which there are oil drops in the spores. The author concludes that the *Discineae*, including *Discina* and *Disciotis*, with the *Morchelleae* constitute the *Morchellaceae*. *Discina venosa* is edible and is often found in the markets of Europe.—*Sarcosphaera coronaria* (Jacq.) Boud. is seen infrequently, but is distributed over middle Europe. The size and color of the apothecium, the color of the hymenium, the size and form of asci and spores are considered. Sizes of asci and spores are presented in tabular form from 9 authorities, and, excluding extremes, a conclusion is reached regarding the size of each. The validity of the subspecies *macrocalyx* (Riess) and the relationships of the species are considered.—*Bruce Fink*.

2729. OVERHOLTS, L. O. Diagnoses of American *Porias*—I. *Mycologia* 14: 1-11. Pl. 1, fig. 1-6. 1922.—*Poria ambigua* Bres., *P. ferruginosa* (Schröd.) Fr., and *P. nigrescens* Bres. are thoroughly described.—*H. R. Rosen*.

2730. PARKS, HAROLD E. California hypogaeous fungi—*Tuberaceae*. *Mycologia* 13: 301-314. 1921.—An account is given as to where and how hypogaeous fungi are collected in California, together with descriptive notes of 16 species in various genera.—*H. R. Rosen*.

2731. PATOUILLARD, N. *Clathrotrichum*, nouveau genre d'hyphomycètes. [*Clathrotrichum*, a new genus of Hyphomycetes.] *Bull. Trimest. Soc. Mycol. France* 37: 33-35. 4 fig. 1921.—A new genus, *Clathrotrichum*, with a single species, *C. subcarneum*, is established in the group *Hyalostilbaceae*. The diagnosis is given from a specimen collected on *Setaria* in Ecuador by Lagerheim.—*D. S. Welch*.

2732. PATOUILLARD, N. Une nouvelle *Lepiote* du Brésil (*Lepiote Puttemansii*). [A new *Lepiote*, *Lepiote Puttemansii*, from Brazil.] *Bull. Trimest. Soc. Mycol. France* 37: 81-83. 1921.

2733. PETRAK, F. *Mycologische Beiträge. I.* [Mycological contributions. I.] *Hedwigia* 62: 282-319. 1921.—This contribution is given in part to a consideration of the following new genera: *Khokia*, a monotypic genus of the *Lophiostomataceae* resting on the type species *K. ambigua* (Pass.) Petr., a parasite on species of *Diatrypella*. *Allantoportha*, a valsoid genus, segregated from *Diaporthe*; the genus is based on the single species *A. tessella* (Pers.) Petr. *Discodiaporthe* is also segregated from *Diaporthe* and contains the 2 species *D. sulphurea* (Fuck.) Petr. and *D. xanthostoma* (Mont.) Petr. *Botryosphaerostroma* is another monotypic genus, erected for *B. quercina* (Sacc.) Petr. and closely related to *Botryodiplodia* of the *Phomataceae*. *Diploplacosphaeria* likewise contains but a single species, *D. ruthenica* Petr., which is closely related to *Thoracella* and *Placosphaerella* of the *Phomataceae*. *Gloeosporidiella* is another monotypic genus, the type species of which, *G. ribis* (Lib.) Petr. seems to be related to *Colletotrichella* of the *Melanconiaceae*.—New species, other than the above, are: *Diatrypella moravica* Petr. & Keissl., *Tapesia moravica*, *Phoma evonymicola*, *Stagonospora catacaumatis*, and *Sphaeropsis hranicencis*.—The remainder of the paper contains critical notes on the following species of ascomycetes and imperfect fungi: *Trichosphaeria nitidula* (Sacc.)

Petr., *Cucurbitaria moravica* Rehm, *Sphaerella septorispora* Sacc., *Diaporthe valsiformis* Rehm, *Valsella Crataegi* Allesch., *Cenangium clandestinum majus* Rehm, *Pezizella culmigena* Sacc., *Lachnella fuscocinnabarinum* Rehm, *Phyllosticta asperulae* Sacc. & Fautr., *Phomopsis elastica* Petr., *Cytospora Petrakii* H. Zimm., *Fusicoccum cornicolum* Sacc., *F. corylinum* Sacc., *F. Ellisii* Petr. & Died., *F. ericeti* Sacc., *F. moravicum* Bub., *F. pulvinatum* Sacc., *Diplodina Kabaliana* Bub., *Septoria asari* Sacc., *Coniothyrium incrustans* Sacc., *Septomyxa picea* Sacc., *Sporonema quercicolum* C. Mass., *Cryptosporiopsis nigra* Bub. & Kab., *Gloeosporium ribis* (Lib.) Mont. & Desm., and *Didymosporium Petrakeanum* Sacc.—Bruce Fink.

2734. PEYRONEL, BENIAMINO. Sur l'identité du *Spirospora Castaneae* Mangin et Vincens et du *Stephanoma italicum* Sacc. et Trav. avec l'*Acrospeira mirabilis* B. et Br. [Concerning the identity of *Spirospora Castaneae*.] Bull. Trimest. Soc. Mycol. France 37: 56-61. 1921.—These 3 forms are shown to be identical, *Acrospeira mirabilis* B. et Br. having priority. A synonymy is given.—D. S. Welch.

2735. POTRON. Morilles sur le champ de bataille. [Morels on the battle field.] Bull. Trimest. Soc. Mycol. France 37: 75-77. 1921.—Morels have been found in unusual abundance on denuded battle fields and among ruins in devastated areas.—D. S. Welch.

2736. REINKING, O. A. Higher Basidiomycetes from the Philippines, and their hosts, V. Philippine Jour. Sci. 19: 91-114. 1921.—The author enumerates about 110 species, the hosts being indicated for nearly all collections cited.—E. D. Merrill.

2737. RODWAY, L. Additions to the fungus flora of Tasmania. Part 3. Papers and Proc. Roy. Soc. Tasmania 1920: 153-159. 1921.

2738. SCHENK, ERNA. Die Fruchtkörperbildung bei einigen Bolbitius- u. Coprinusarten. 8 vo., 64 p., 12 fig. Diss. Heidelberg, 1919.

2739. SHEAR, C. L. Review of Klebahn on life histories of Ascomycetes. [Rev. of: KLEBAHN, H. Haupt- und Nebenfruchtformen der Askomyzeten. Erster Teil, Eigene Untersuchungen. 8 vo., 395 p., 275 fig. Gebrüder Borntraeger: Leipzig, 1918.] Mycologia 13: 346-350. 1921.—“This work will be of great value to all mycologists and pathologists, as the various papers which have been published on life history studies are much scattered * * *.” As to Klebahn's plan of dividing the genus *Mycosphaerella* according to the spore types of the imperfect fungi which have been found to be connected with the ascogenous form, as *Septorisphaerella* with *Septoria* as the imperfect stage, *Ramularisphaerella* with *Ramularia* as the imperfect stage, etc., the reviewer concludes “there is much more to be said against the plan than for it.”—H. R. Rosen.

2740. SIEGLER, E. A., and A. E. JENKINS. A new *Sclerotinia* on mulberry. Science 55: 353-354. 1922.—This new species, on fruits of cultivated *Morus alba*, is described and named *Sclerotinia carunculoides*.—C. J. Lyon.

2741. TANAKA, TYÔZABURÔ. New Japanese fungi—notes and translations—X. Mycologia 13: 323-328. 1921.—The following fungi occurring on *Thea sinensis*, originally described in Japanese, are redescribed: *Hypodermopsis Theae* K. Hara parasitic on trunks and branches, *Stagonospora Theae* K. Hara saprophytic on trunks, *Leptosphaeria Hottai* K. Hara parasitic on trunks, *Sillia Theae* K. Hara parasitic on trunks and branches, *Ascochyta Theae* K. Hara parasitic on leaves, *Valsa Theae* K. Hara parasitic on weakened trunk, *Diatrype Theae* K. Hara saprophytic on trunks, and *Hendersonia Theae* K. Hara parasitic on leaves.—H. R. Rosen.

2742. THOM, C. [Rev. of: GUILLIERMOND, A. The yeasts. (Les levures.) Translated by: TANNER, FRED WILBUR. John Wiley and Sons: New York, 1920.] Absts. Bact. 5: 376. 1921.—This translation (of the 12th edition) follows the original very closely, “too literally in

many cases" except in the chapters on physiology where it becomes a revision.—*D. Reddick*.

2743. TORREY, GEORGE SAFFORD. *Coronella nivea* Crouan. Bull. Trimest. Soc. Mycol. France 37: 88-93. Pl. 10. 1921.—Cultural characters, morphology, parasitism, and affinities of the species are discussed; a synonymy and short bibliography are appended.—*D. S. Welch*.

2744. TORREY, GEORGE SAFFORD. Les conidies de *Cunninghamella echinulata* Thaxter. [The conidia of *Cunninghamella echinulata* Thaxter.] Bull. Trimest. Soc. Mycol. France 37: 93-98. Pl. 10. 1921.—A cytological study shows that the so-called conidia of *C. echinulata* are produced in a manner similar to the conidia of the Hyphomycetes. A double membrane was not observed in any of the spores. In spite of these facts it seems possible to arrange a series of genera in the Mucorales which shows how this conidium might have been developed from a sporangium. It is not necessary to suppose that the conidia of the Hyphomycetes have had the same origin.—*D. S. Welch*.

2745. VINCENS, F. Valeur taxinomique du sillon germinatif des ascospores chez les Pyrénomycètes. [Taxonomic value of the germinal ridge of the ascospores in pyrenomycetes.] Bull. Trimest. Soc. Mycol. France 37: 29-33. 1921.—A previous publication by the author has been sharply criticized by Chenantais. This criticism contains no suggestions of a constructive nature. That changes in the present systematic arrangement of genera would be caused by the adoption of the suggested criterion is not a good argument for its rejection. Chenantais fails to quote authorities. He has himself said that the spore and its characters are the best index of relationship. The author proposes to maintain his former statements until shown that they are untenable.—*D. S. Welch*.

2746. WELLES, C. G. *Cercospora* leaf spot of *Averrhoa carambola*. Philippine Jour. Sci. 19: 447-451. Pl. 1-2. 1921.—*Cercospora Averrhoi*, described as a new species, causes a serious disease of *Averrhoa carambola*. Control methods are indicated.—*E. D. Merrill*.

2747. WILL, H. Einige Mitteilungen über die Beeinflussung des Sporenbildungsvermögens durch das Auftragen der Hefe auf den trockenen Gipsblock. [Notes on influence on the spore-forming property of yeasts when transferred to dry gypsum blocks.] Centralbl. Bakt. II Abt. 53: 471-480. 1920.—In parallel experiments, yeast cells were transferred to dry and moistened gypsum blocks. In 9 tests an appreciably higher percentage of spores was obtained on the moistened blocks.—*Anthony Berg*.

LICHENS

2748. C., A. H. [Rev. of: SMITH, ANNIE LORRAIN. Lichens. xxviii + 464 p., 135 fig. University Press: Cambridge, 1921.] Jour. Botany 59: 331-333. 1921.

2749. D., O. V. Lichens. [Rev. of: (1) SMITH, ANNIE LORRAIN. Lichens. xxviii + 464 p., 135 fig. University Press: Cambridge, 1921. (2) SMITH, ANNIE LORRAIN. A handbook of the British lichens. vii + 158 p. British Museum: London, 1921.] Nature 109: 5-6. 1922.—The first is considered not well illustrated as a whole. The figure on p. 117 appears to be *Cladonia uncialis* instead of *C. furcata*. More reference to exsiccata are considered desirable. The fact that most lichens will not grow in polluted city air is regarded as perhaps a reason for the common lack of interest in them.—The second is only a key to the first.—*O. A. Stevens*.

2750. LESDAIN, BOULY DE. Lichenes prope Habanam in insula Cuba anno 1914 a cl. fratre Arsène Brouard lecti. [Lichens collected near Havana, Cuba, by Father Brouard in 1914.] Bryologist 24: 68-69. 1921.—The list enumerates, with habitats, 28 species and varieties. *Endopyrenium Brouardi* and *Tomasellia Brouardi* are proposed as new species, with new varieties in *Caloplaca*, *Opegrapha*, and *Gyrostomum*, and new combinations in *Placodium*, *Toninia*, and *Bacidia*.—*E. B. Chamberlain*.

2751. MELLOR, ETHEL. Les lichens vitricoles et leur action mécanique sur les vitreaux d'église. [On glass-attacking lichens and their mechanical action on church windows.] Compt. Rend. Acad. Sci. Paris 173: 1106-1108. 1921.—A list of 22 species of lichens found growing on church windows is given. It is found that such windows become scaly and may become partly opaque and give the spectral colors. Corrosion of the glass may take place to a depth of 5 mm. and is believed to be due to the CO₂ given off in the respiration of the fungus. It is also aided by water and the mechanical action of the lichen upon the glass.—C. H. Farr.

2752. STRATO, CL. Über Wachstum und Regeneration des Thallus von *Peltigera canina*. [Concerning growth and regeneration of the thallus of *Peltigera canina*.] Hedwigia 63: 11-42. Fig. 1-13. 1921.—The work was begun by Strato in 1913 and continued at intervals until he fell in battle in 1917, when F. TOBLER undertook to bring the results together and finish the research. The plants were in part observed in their natural habitats, and others were observed in transplanted cultures, where control could be secured with respect to substrata and other conditions of environment. The sectioning was done freehand for the most part, and stains and other chemicals were used to secure desired results. The growth of the thallus was found to be marginal. The origin and development of the marginal undulations are not distinctly different from those of the isidia, except as to position, the latter appearing on the dorsal surface. Through injury isidia are often produced in large numbers; the algal-host cells may appear at the surface, while the lichen hyphae grow upward around them and thus form the isidia. The frequent appearance of isidia in rows is related to their development along rifts in the thallus; the isidia sometimes function in vegetative reproduction. Small portions of the thallus also often function in regeneration, which proceeds mainly from the hyphae of the medullary layer below the cortical plectenchyma, the algal-host cells being thus carried into the regenerated thallus. The part of plectenchyma in regeneration is small. The results are against the view that the algal-host cells originate from the hyphae and are, therefore, a part of the lichen as was advanced by Minks and later confirmed by Elfving.—Bruce Fink.

2753. ZAHLBRUCKNER, A. *Catalogus lichenum universalis*. Vol. I, part 2. iv + 320 p. Gebrüder Borntraeger: Berlin, 1921.

BACTERIA

2754. ALBERT, HENRY. A classification of diphtheria bacilli based on the toluidin blue-iodine method of staining. [Abstract.] Absts. Bact. 5: 25. 1921.

2755. ALBERT, HENRY. Variations in the morphology of the diphtheria bacillus due to age. [Abstract.] Absts. Bact. 5: 14-15. 1921.—Marked differences in size, shape, and granulation are noted for 125 cultures.—D. Reddick.

2756. AYERS, S. H., and P. RUPP. Differentiation of hemolytic streptococci from human and bovine sources by the hydrolysis of sodium hippurate. Jour. Infect. Diseases 30: 388-399. 1922.—The beta hemolytic types of streptococci can be separated into those of the bovine udder, which hydrolyze hippuric acid into benzoic acid and glycolic acid, and those of human origin, which do not.—Selman A. Waksman.

2757. BAKER, H. R. Substitution of brom-thymol-blue for litmus in carbohydrate media. [Abstract.] Absts. Bact. 6: 3. 1921.—The advantages of brom-thymol-blue (1:41,666) over litmus for quantitative determination of acid or alkali production by bacteria are described.—D. Reddick.

2758. BAYNE-JONES, S., and PAULINE ZINNINGER. The decomposition of tryptophane by staphylococci without the production of indol. [Abstract.] Absts. Bact. 5: 3. 1921.—One hundred fifteen strains of staphylococci were tested on numerous media. "The medium in which tryptophane was the only source of nitrogen served for the growth of staphylococci

but was not decomposed to indol." It is concluded that indol is not produced by staphylococci.—*D. Reddick.*

2759. BEAUDETTE, F. R., and L. D. BUSHNELL. A study of an organism isolated from the unabsorbed yolks of chicks dead in the shell. [Abstract.] *Absts. Bact.* 6: 19-20. 1922.—The organism, which is pathogenic, is described in some detail. It is near *Bacillus pullorum* in its reactions.—*D. Reddick.*

2760. BEHRENS, CHARLES A. The cultivation of *Spirochaeta Novyi* without the use of tissue from animal organs. *Proc. Indiana Acad. Sci.* 1919: 225-228. 1921.—A culture of *Spirochaeta Novyi* has been perpetuated for 6 generations upon aseptic fluid containing defibrinated normal blood. The cultural type differs from the normal blood type in its morphology and its staining properties.—*F. C. Anderson.*

2761. BERGEY, D. H. A simple substitute for the Hiss serum-water medium. *Absts. Bact.* 6: 5. 1922.—The substitute consists of a 1 per cent solution of casein in ordinary peptone solution. It may be sterilized in the autoclav.—*D. Reddick.*

2762. BREED, ROBERT S. Some observations on the habitat and distribution of bacteria. [Abstract.] *Absts. Bact.* 6: 11-12. 1922.—The author discusses the use that can be made of the habitat and distribution of bacteria in interpreting the probable evolutionary development of this group of plants.—*D. Reddick.*

2763. BROWN, J. HOWARD. A method for the micro gas analysis of bacterial cultures. [Abstract.] *Absts. Bact.* 6: 5-6. 1922.—A layer of vaseline about 1 cm. thick is added to the culture medium. The vaseline plug acts as a self lubricating piston and remains intact as it is forced up the tube by the gas. An all-glass syringe with a long needle is used as a gasometer. Tests of anaerobic and aerobic uses are described.—*D. Reddick.*

2764. BROWN, J. HOWARD, and PAUL E. HOWE. Transparent milk medium. [Abstract.] *Absts. Bact.* 6: 4. 1922.—The medium is prepared by mixing 1 part of "skim milk," 2 of water, and 0.4 per cent sodium citrate. The mixture is allowed to stand for about 1 hour when it is ready for sterilization. Transparent milk possesses certain advantages over ordinary milk.—*D. Reddick.*

2765. BROWNE, WILLIAM W. Halophilic bacteria. [Abstract.] *Absts. Bact.* 6: 38. 1922.—The biology of *Spirochaeta halophilica* and of *Bacterium halophiliticum* is presented in brief.—*D. Reddick.*

2766. BROWNE, WILLIAM W. The staining of halophilic bacteria. [Abstract.] *Absts. Bact.* 6: 25-26. 1922.

2767. BUCHANAN, R. E. Report of the Committee on Taxonomy. [Abstract.] *Absts. Bact.* 6: 1. 1922.—The Committee offers its services in regard to nomenclatorial problems. *Streptococcus lactis* Lister is the correct name for the ordinary lactic acid organism of milk. No agreement has been reached on the use of the term *Bacterium* as a generic name.—*D. Reddick.*

2768. CHAPIN, C. W. Review of our knowledge of *Bacterium tularense*. [Abstract.] *Absts. Bact.* 5: 25. 1921.—The organism causes "deer-fly fever." It is not related morphologically or culturally to the organism of bubonic plague. The only known media on which it can be grown are those containing egg yolk.—*D. Reddick.*

2769. CLARK, P. F., and E. J. MURPHY. Virulent *Micrococcus catarrhalis* widely disseminated in throats during an outbreak of influenza. [Abstract.] *Absts. Bact.* 5: 21-22. 1921.

2770. CONN, H. J. An abundant but little known group of soil bacteria. [Abstract.] Absts. Bact. 5: 8-9. 1921.—The group is characterized as follows: non-spore-forming rods, $0.2-0.5 \times 0.4-1.0 \mu$, gram-negative, non-motile or with 1 to few polar flagella, gelatin liquefaction slow or absent, growth in liquid media scanty or lacking, but abundant on the surface of agar. Fermentative and reducing activities must be tested on an agar medium instead of in broth.—From 70 to 80 per cent of all the colonies on soil plates are of this type.—D. Reddick.

2771. CONN, H. J. Report of Committee on Bacteriological Technic. [Abstract.] Absts. Bact. 5: 1. 1921.

2772. CONN, H. J. Report of the Committee on Bacteriological Technic. [Abstract.] Absts. Bact. 6: 1. 1922.

2773. DENIER, PIERRE. Les bactéries des nodules des légumineuses. [Rev. of: LÖHNIS, F., and ROY HANSEN. Nodule bacteria of leguminous plants. Jour. Agric. Res. 20: 543-555. Pl. 68-69. 1921 (see Bot. Absts. 8, Entry 1332).] Rev. Bot. Appl. 1: 24-29. 1921.

2774. FISK, E., and E. L. BURKY. Study on the classification of streptococci. Jour. Infect. Diseases 30: 128-140. 1922.—A study was made of the classification of streptococci by the appearance of deep colonies in blood agar, fermentation, and agglutination reactions. Green and hemolytic streptococci were found to be distinct culturally and serologically. The sugar reactions, with the possible exception of inulin fermentation and the reaction of milk, are not indicators of serologic groupings.—Selman A. Waksman.

2775. FITCH, C. P., and D. C. BEAVER. A study of an organism isolated from cases of nephritis in sheep. [Abstract.] Absts. Bact. 5: 17. 1921.—A small, non-motile rod, pathogenic for sheep "has been named *Bacterium nephritidis* var. *ovis*."—D. Reddick.

2776. GILBERT, RUTH, and MARION B. COLEMAN. The relative efficiency of various differential media for the isolation of organisms of the enteric disease group. [Abstract.] Absts. Bact. 6: 35-36. 1922.—Brilliant green agar, eosin brilliant green agar, eosin methylene blue agar, and Endo agar were tested. The first 2 can not be used alone because of the inhibitive action of *B. dysenteriae*. The third has proved very satisfactory.—D. Reddick.

2777. GROUITCH, VERA. Contributions à l'étude de la flore bacterienne du Lac de Genève. [Contributions to a study of the bacterial flora of Lake Geneva.] Bull. Soc. Bot. Genève 12: 246-273. 1920.—Six species of nitrate reducing bacteria were obtained from Lake Geneva. The cultural characteristics of the following new species are given in detail: *a*, found at the surface of the lake, *Bacterium rhodopelagicum*, *Pseudomonas oligotricha*, *P. longicauda*, and *P. genevensis*; *b*, found at a depth of 10 m., *Bacterium pseudomesenteroides*, *Pseudomonas erythraea*, *Micrococcus lacustris*, *Streptococcus lacustris*, *Sarcina lacustris*, and *Bacterium brachyococcum*.—W. H. Emig.

2778. HALL, IVAN C. A differential key for the identification of the sporulating anaerobes. Absts. Bact. 6: 8. 1922.—The key is presented *in toto*.—D. Reddick.

2779. HALL, IVAN C. The production of tyrosine by a putrefactive anaerobe. [Abstract.] Absts. Bact. 6: 6-7. 1922.—*Bacillus centrosporogenes* "n. sp.," *B. tyrosinogenes* "n. sp.," *B. bifementans*, and *B. histolyticus*, in contrast with other putrefactive anaerobes, seem unable to metabolize tyrosin. A brief description of *B. tyrosinogenes* is presented.—D. Reddick.

2780. HELLER, H. H. Studies of colony formation in deep agar. VI. Studies on pathogenic anaerobes. Jour. Infect. Diseases 30: 1-17. 8 fig. 1922.—A collection of anaerobic bacilli corresponding in all cultural characteristics may be broken up into groups on the basis of colony formation in deep agar. The shape of the colony depends on the reproductive power

of the organism and its motility in the agar medium, the first depending on the enzymes formed and metabolic activities. A change in these will give rise to a change in colony morphology, which can thus serve as a basis for the study of mutations. Preparation of colonies, their photography, contamination, crowding, permeating growth, uniform conditions, and choice of medium are discussed.—*Selman A. Waksman*.

2781. HEWLETT, R. T. A manual of bacteriology. 8 vo., 818 p. J. and A. Churchill: London, 1921.

2782. HITCHINS, A. PARKER. The advantages of small percentages of agar. II. The biochemical relations of the anaerobic bacilli. [Abstract.] Absts. Bact. 6: 36-37. 1922.

2783. HITCHENS, A. PARKER. The production of yeast "vitamine" in the laboratory for the cultivation of bacteria. [Abstract.] Absts. Bact. 6: 35. 1922.—The method is described in necessary detail.—*D. Reddick*.

2784. HUCKER, G. J. A modification and a new application of the gram stain. [Abstract.] Absts. Bact. 5: 3. 1921.

2785. HUCKER, G. J. Comparison of various methods of gram staining. (Preliminary report.) [Abstract.] Absts. Bact. 6: 2. 1922.—Any one of 4 methods tested is good if a fresh mixture of stain is used and the time of decolorizing is kept under 2 minutes.—*D. Reddick*.

2786. HUCKER, G. J. Preliminary report on the flora of cheddar cheese. [Abstract.] Absts. Bact. 6: 16. 1922.

2787. JONES, F. S. An organism resembling *Bacillus actinoides* cultivated from pneumonic lungs of white rats. [Abstract.] Absts. Bact. 6: 19. 1922.

2788. KAHN, MORTON C. A cultural study of anaerobic spore-bearing bacteria with strains purified by the Barber single cell technique. [Abstract.] Absts. Bact. 6: 9. 1922.

2789. KAYSER, E. Microbiologie appliquée à la transformation des produits agricoles. 390 p. J. B. Baillière et Fils: Paris, 1921.

2790. KELSER, R. A. *Bacillus necrophorus*, its activities among equines during the world war. [Abstract.] Absts. Bact. 6: 21. 1922.

2791. KOSER, STEWART A. Differentiation of the paratyphoid-enteritidis group by means of the disaccharid trehalose. [Abstract.] Absts. Bact. 5: 12. 1921.—*Bacillus suispestifer* does not attack trehalose but *B. paratyphosis*, *B. Schottmülleri*, *B. aertryckei*, and *B. enteritidis* ferment trehalose with the production of acid and gas. In a serum water medium containing 0.5 per cent trehalose and 1 per cent Andrade indicator, *B. aertryckei* and *B. enteritidis* produce a red coagulum in 3-4 days, while *B. Schottmülleri* produces only a light pink or colorless coagulum.—*D. Reddick*.

2792. LAYBOURN, R. L. The effect of the reaction of media upon the morphology of the diphtheria bacillus. [Abstract.] Absts. Bact. 5: 14. 1921.—*Bacillus diphtheriae* is longest and most granular on uncoagulated Loeffler blood serum of pH 7.0-7.5. There is a proportional decrease in length and in amount of granulation when grown on media either more acid or more alkaline than the ones indicated.—*D. Reddick*.

2793. LEFEVRE, EDWIN. Pickle and sauerkraut experiments. [Abstract.] Absts. Bact. 6: 24-25. 1922.—Fermentation in weak (5 per cent) and strong (10 per cent) brines has been studied. The essential organism in all brine fermentations is *Lactobacillus Brassicae* Wehmer.—*D. Reddick*.

2794. LEVINE, VICTOR E., and HERMAN M. JAHR. The reducing action of micro-organisms on ammonium molybdate. [Abstract.] Absts. Bact. 5: 4-5. 1921.—Certain organisms reduce ammonium molybdate with the production of a blue coloration. It may prove possible to make use of this reaction as a differential test.—D. Reddick.

2795. LIM, R. K. S. A parasitic spiral organism in the stomach of the cat. Parasitology 12: 108-112. Pl. 7. 1920.—The organism is regarded as a new species of the Spirochaetoideae resembling both the genus *Sporonema* and the genus *Treponema*; its exact position in the group is left undetermined. The organism is not common or parasitically important.—C. D. Sherbakoff.

2796. LYON, M. W., JR., and MILO K. MILLER. Case of meningitis in infant due to a thread-like organism. [Abstract.] Absts. Bact. 5: 22. 1921.—An apparently new species of microorganism, *Bacillus trichodiphtheroides*, has been isolated from a case of purulent meningitis.—D. Reddick.

2797. MacINNES, JEAN. A bacterial disintegration of wool. [Abstract.] Absts. Bact. 6: 12. 1922.—Characteristic disintegration does not occur at any temperature unless the wool is very moist.—D. Reddick.

2798. MELLON, RALPH R. Further studies on diphtheroids. Jour. Med. Res. 42: 111-126. 1920-1921.—Additional evidence is presented to support previous publications reporting induced mutations from single cell cultures of the so-called *C. Hodgkini* [see Bot. Absts. 10, Entry 1071]. Certain criticisms made by Ebersson are answered.—J. G. Leach.

2799. MELLON, RALPH R. The diplococcus and bacillary stages of *B. coli* and their possible relation to growth cycles and sexuality. [Abstract.] Absts. Bact. 6: 24. 1922.

2800. MISHULOW, LUCY. Differences in the character of the hemolytic action of streptococci and the relative value of various methods in demonstrating these differences. [Abstract.] Absts. Bact. 6: 36. 1922.

2801. MISHULOW, LUCY, and CHARLES KRUMWIEDE. The existence of different immunological types of *B. pertussis*. [Abstract.] Absts. Bact. 6: 28. 1922.

2802. MORSE, STERNE. A multiple pipette. [Abstract.] Absts. Bact. 6: 11. 1922.

2803. MORSE, STERNE, and NICHOLAS KOPELOFF. A simple method for anaerobic cultivation in petri dishes. [Abstract.] Absts. Bact. 6: 36. 1922.

2804. NEILL, JAMES. A comparative study of different types of streptococci. [Abstract.] Absts. Bact. 6: 32. 1922.

2805. NORTON, JOHN F., and MARY V. SAWYER. Indol production by bacteria. [Abstract.] Absts. Bact. 5: 2. 1921.—Trypsinized peptone or casein is the best medium. Erlich's reagent is the most reliable.—D. Reddick.

2806. ORLA-JENSEN. Dairy bacteriology. 8 vo., 192 p. J. and A. Churchill: London, 1921.

2807. PAXSON, W. H., and EDWARD REDOWITZ. *Bacillus diphtheriae*. Immunological types and toxin-antitoxin relationship. [Abstract.] Absts. Bact. 6: 28. 1922.

2808. PRYER, R. W. The alkali producing organism in scarlet fever. [Abstract.] Absts. Bact. 5: 22. 1921.—The organism has been found only in cases of scarlet fever. "It is probably not a true bacterium" but may be a yeast. Its cultural characters are noted.—D. Reddick.

2809. REDDISH, GEORGE F., and LEO F. RETTGER. A cultural and biochemical study of certain known anaerobes. [Abstract.] Absts. Bact. 6: 7. 1922.

2810. REDDISH, GEO. F., and LEO F. RETTGER. An investigation into the purity of strains of *Bacillus botulinus* obtained from different sources in this country. [U. S. A.] [Abstract.] Absts. Bact. 5: 14. 1921.—Attempts to obtain pure cultures of a toxic strain of *B. botulinus* were unsuccessful. *Bacillus sporogenes* is usually a contaminant in American cultures. Toxic strains of *B. botulinus* ferment sucrose with production of gas whereas the non-toxic strain does not.—D. Reddick.

2811. REDDISH, GEORGE F., and LEO F. RETTGER. Clostridium putrifaction (*B. putrificus* Bienstock) a distinct species. [Abstract.] Absts. Bact. 6: 9. 1922.

2812. RETTGER, LEO F., and WALTER L. KULP. A note on the choice of culture media for the study of *Lactobacillus* with special reference to the carbohydrates employed. [Abstract.] Absts. Bact. 6: 24. 1922.—An agar medium containing 0.5–1 per cent galactose is a good substitute for whey broth and whey agar in the cultivation of *Lactobacillus acidophilus*.—D. Reddick.

2813. RIVERS, T. M., and ERIDA L. LEUSCHNER. Hemolytic influenza bacilli. [Abstract.] Absts. Bact. 5: 21. 1921.—The name influenza bacilli is urged for a group of unclassified bacteria usually found in throat cultures, the characters of which are briefly described.—D. Reddick.

2814. ROOS, C., and E. C. EARLE. Studies on the group IV pneumococci. [Abstract.] Absts. Bact. 6: 28. 1922.

2815. ROOS, C., and E. MAY GRAY. Studies upon *Streptococcus*. II. Cultural versus biological classification. [Abstract.] Absts. Bact. 5: 15. 1921.—“The older cultural methods are inadequate for the classification of certain types of pathogenic microorganisms, notably streptococci.”—D. Reddick.

2816. SCHNEIDER, ALBERT. The microbial symbionts of the tongue and alveoli in health and in pyorrhea alveolaris. [Abstract.] Absts. Bact. 5: 21. 1921.

2817. SHERMAN, J. M. Some notes on the lactobacilli. [Abstract.] Absts. Bact. 5: 6. 1921.

2818. SHERMAN, J. M., and W. R. ALBUS. The cultivation of certain of the lactobacilli. [Abstract.] Absts. Bact. 6: 17. 1922.—A satisfactory medium for propagation of lactobacilli contains 1 per cent each of a fermentable carbohydrate, peptone, dried yeast, butter fat, and 0.1 per cent agar; the reaction is adjusted to pH 6.5–7.0.—D. Reddick.

2819. STRIEGEL, KARL. Über Typhus abdominalis. Paratyphus B u. A. 8 vo., 62 p. Diss. Erlangen, 1920.

2820. VOGEL, J., und ZIFFEL. Beiträge zur Frage der Verwandtschaftsverhältnisse der Leguminosen-Knöllchenbakterien und deren Artbestimmung mittels serologischer Untersuchungsmethoden. [Contribution to the question of relationships of the legume-nodule bacteria and their specific determination by sereologic methods.] Centralbl. Bakt. II Abt. 54: 13–34. 1921.—This is a detailed study of the preparation of immune sera with cultures of *Bacillus radiculicola*. The groups of legume bacteria were separated by means of agglutinin and precipitin reactions. By the use of homologous sera, the leguminous bacteria can be separated into several groups, agreeing with those found by inoculation tests. I. *Lupinus* bacteria.—Immune serum from *L. angustifolius* bacteria agglutinates in an equal measure to

homologous bacteria; also those of *L. luteus*, *L. perennis*, *Ornithopus sativus*, without leaving any influence on species II to VI.—II. *Trifolium* bacteria.—Immune serum from *T. pratense* bacteria agglutinates, in addition to homologous bacteria, also those of *T. incarnatum*, *T. repens*, and *T. hybridum*, and has no action on the other 5 species.—III. *Medicago* bacteria.—Immune serum from *Medicago sativa* bacteria agglutinates, in addition to homologous bacteria, also those of *M. lupulina*, *Melilotus albus*, and *Trigonella Foenum graecum*, and has no other action on the other 5 species.—IV. *Pisum* bacteria.—Bacteria from *P. sativum* agglutinate, in addition to the homologous form, only the bacteria of *Vicia sativa*.—V. *Faba* bacteria.—Immune serum of *Phaseolus vulgaris* agglutinates only homologous bacteria and no others.—This method of serum agglutination can also be applied to the study of legume bacteria found in the soil. *Azotobacter Chroococcum* and *Bacillus radicola* are found to have no relation whatever when studied by means of serum agglutination.—Anthony Berg.

2821. WARD, ARCHIBALD R. The etiology of polyarthrititis in swine. [Abstracts.] Absts. Bact. 6: 22. 1922.—*Bacterium erysipclatis-suis* is the etiologic agent.—D. Reddick.

2822. WYANT, ZAE NORTHRUP. A new upright counting apparatus for plate cultures. [Abstract.] Absts. Bact. 5: 209. Pl. 1-2. 1921.

2823. WYANT, ZAE NORTHRUP. A simple cremator. Absts. Bact. 5: 209-210. Pl. 3. 1921.—A metal cylinder 30 × 6.5 cm., closed at one end except for a hole large enough to admit a gas burner, is placed over the flame used for sterilizing transfer needles. Sputtering droplets fall against the hot metal and are instantly evaporated.—D. Reddick.

MYXOMYCETES

2824. BUCHET, S. A propos d'un récent travail sur les Myxomycètes. [Concerning a recent work on the Myxomycetes.] [Rev. of: SKUPIENSKI, F. X. Recherches sur le cycle évolutif de certains Myxomycètes. (Investigations on the life history of certain Myxomycetes.) Thesis Paris, 1920.] Bull. Trimest. Soc. Mycol. France 37: 39-43. 1921.—Skupienski has published a thesis on the morphology and development of some Myxomycetes in which he has made statements which the author regards as inaccurate or without proof. He has failed to give former workers in this field the credit for their discoveries. The identification of *Didymium nigripes* is incorrect. His conclusion that the yellow color of the plasmodium is caused by bacteria is without proof. Skupienski has a false conception of the sclerotium in Myxomycetes. His statement that plasmodia are able to "eat gelatin" must be questioned.—[See also Bot. Absts. 11, Entries 2825, 2827.]—D. S. Welch.

2825. BUCHET, S. Réponse à M. Skupienski. [A reply to Mr. Skupienski (see Bot. Absts. 11, Entry 2827).] Bull. Trimest. Soc. Mycol. France 37: 83-87. 1921.—The author reaffirms the statements which he has made in his recent review [see Bot. Absts. 11, Entry 2824] concerning the work of Skupienski. He assures the latter that his criticism is impersonal and again invites him to a personal conference in his own laboratory where his knowledge and experience may receive a fair test. After reviewing his arguments in rebuttal the author states that it is his intention to consider the discussion closed.—D. S. Welch.

2826. MATZ, J. A new vascular organism in sugar cane. Jour. Dept. Agric. Porto Rico 4: 41-46. Fig. 7-9. 1920.—An organism, here named *Plasmodiophora vascularum* n. sp., was found in the annular and spiral tracheides and pitted vessels in the vascular bundles in the lower internodes of cane suffering from yellow-stripe and top-rot disease.—Geo. H. Dungan.

2827. SKUPIENSKI, F. X. Réponse à la critique de M. Buchet, concernant un récent travail sur les Myxomycetes. [Reply to a criticism.] Bull. Trimest. Soc. Mycol. France 37: 44-53. 1921.—The author discusses the objections raised by his critic and disposes of each of them in turn. [See also Bot. Absts. 11, Entry 2825.]—D. S. Welch.

2828. WANN, F. B., and W. C. MUENSCHER. A preliminary list of the Myxomycetes of the Cayuga Lake basin. *Mycologia* 14: 38-41. 1922.—About 800 specimens of slime moulds collected in central New York form the basis of the present list comprising "92 species, in 30 genera and 11 families."—*H. R. Rosen.*

PALEOBOTANY AND EVOLUTIONARY HISTORY

E. W. BERRY, *Editor*

(See also in this issue Entries 2449, 2517, 2649, 3228)

2829. BARTRUM, J. A. Note on the Port Waikato Mesozoic flora. *New Zealand Jour. Sci. and Tech.* 4: 258. 1921.—The author records the following additions to the fossil flora found near Port Waikato, New Zealand: *Araucarites cutchensis* Feist., *Coniopteris hymenophylloides* (Brongn.), *Stachytarax* (?) c. f. *elegans* Nath., *Elatocladus plana* (Feistm.).—*E. W. Berry.*

2830. BERRY, E. W. A new genus of fossil fruit. *Amer. Jour. Sci.* 3: 251-253. 2 fig. 1922.—*Calatoloides eocenicum*, a new genus and species of Icacinaceae, is described from the Wilcox Eocene of Texas.—*E. W. Berry.*

2831. BERRY, E. W. Additional occurrences of Pleistocene plants. *Torreyia* 22: 10-11. 1922.—From a railroad-cut near Mountain Creek, Chilton County, Alabama, are recorded *Pinus glabra* Walt., *Arundinaria* sp. (probably *macrosperma* Michx.), and *Hicoria* sp., (probably *minima* (Marsh.) Britton).—From a 35-foot well in the loess $5\frac{1}{2}$ miles northwest of Covington, Tipton County, Tennessee, are reported fruits or seeds of *Carex* sp., *Persicaria* sp., *Meibomia paniculata* (L.) Kuntze, and *Viburnum* sp. (probably *nudum* L.).—*J. C. Nelson.*

2832. BERRY, E. W. Carboniferous plants from Peru. *Amer. Jour. Sci.* 3: 189-194. 1922.—The author describes a small Carboniferous flora from the peninsula of Paracas in southern Peru.—*E. W. Berry.*

2833. BERRY, E. W. The flora of the Cheyenne sandstone of Kansas. U. S. Geol. Surv. Professional Paper 129: 199-225. Pl. 46-61. 1922.—The author describes a flora of 23 species from the Cheyenne sandstone of southern Kansas and determines its age as Upper Cretaceous. The flora comprises 4 ferns, 2 cycadophytes, 4 gymnosperms, 1 monocotyledon, and 12 dicotyledons—the last including a new species of fruit and a new *Sapindopsis*.—*E. W. Berry.*

2834. BERRY, E. W. The flora of the Woodbine sand at Arthurs Bluff, Texas. U. S. Geol. Surv. Professional Paper 129: 153-181. Pl. 36-40. 1922.—The author describes 43 species of mostly well known Upper Cretaceous plants from the Woodbine formation of Arthurs Bluff, Texas, and concludes that they correspond in age with the Turonian stage of the European Upper Cretaceous. The only noteworthy new form is the new genus *Trochodendroides* considered to be ancestral to the existing Trochodendraceae.—*E. W. Berry.*

2835. CARPENTIER, A. Note sur quelques végétaux à structure conservée des environs de Ste. Marie aux-Mines (Alsace). [Note concerning some plants with structure preserved in the vicinity of Ste.-Marie- aux-Mines (Alsace).] *Rev. Gén. Bot.* 33: 684-693. Pl. 34. 1921.—In a fragment of silicified hacksel from the vicinity of Sainte-Marie- aux-Mines (Alsace), the author found a petiole of the genus *Myeloxylon*; leaves of *Alethopteris Grandini*; minute leaves with curved edges, and well developed palisade tissue; small roots perfectly preserved; some leaves of the Cordaitales; a leaf trace of the primary petiole of *Anachoropteris* (*Zygoterideae*); and sporangial rings. Notes and comparisons with other specimens are included.—*J. C. Gilman.*

2836. COCKERELL, T. D. A. A fossil buttercup. *Nature* 109: 42-43. 1 fig. 1922.—The author describes an achene of *Ranunculus florissantensis* n. sp. from Miocene shale at

Florissant, Colorado. The achene shows 2 seeds. It would be interesting to determine whether any of the present species have at first 2 ovules.—O. A. Stevens.

2837. DARWIN, LEONARD. Organic evolution, outstanding difficulties and possible explanations. Cambridge University Press, 1921.

2838. FRENTZEN, K. Keuperflora und Lunzer Flora. [Keuper flora and Lunz flora.] Centralbl. Min. Geol. u. Paleo. 1: 23-28. 1922.—The author concludes that the Lunz flora is contained in the equivalent of the Schilfsandstein and is lower middle Keuper in age.—E. W. Berry.

2839. FRITEL, P. H. Contribution à l'étude des flores tertiaires. [Contributions to the study of tertiary floras.] Bull. Mus. Nat. Hist. [Paris] 27: 471-476. 1921.—This comprises an enumeration of the lower Miocene flora of Oropo, Greece, and an account of the discovery of the fruits of the Nipa palm (*Nipadites Burtini*) in the lower Eocene (Ypresian) at Gau, Basses-Pyrenees, France.—E. W. Berry.

2840. KURTZ, F. Atlas de las plantas fósiles de la Republica Argentina. [Atlas of plant fossils from Argentina.] Actas Acad. Nacion. Cien. Cordoba 7: 133-153. Pl. 1-27. 1921.—This is a posthumous publication of the notes and illustrations of fossil plants from the Argentine Republic prepared by Prof. Kurtz of Cordoba. The work is more or less disjointed owing to its nature but is most important since here is figured for the first time a large number of fossil plants from the Rhaetic, Lias, and Permian of Argentina. New species are proposed in the genera *Danaeopsis*, *Acrocarpus*, *Sphenopteris*, *Sphenopteridium*, *Rhacopteris*, *Odonopteris*, *Archaeopteris*, *Bergiopteris*, and *Neuropteridium*.—E. W. Berry.

2841. LINDENBEIN, H. Les Protophycees (*Gloeocapsomorpha prisca* Zalessky) une flore marine du Silurien inferieur de la Baltique. [A marine alga of the Lower Silurian of the Baltic.] Bull. Soc. Bot. Genève 12: 274-292. Fig. 1-7. 1920.—Microscopic sections of a Silurian bituminous schist present cell groups resembling *Gleocapsa* of the Cyanophyceae, though the radiating arrangement of the dichotomously branched rows of cells is more like that of the epiphytes of the Coleochetaceae. The author would classify this fossil alga in a separate family somewhere between Cyanophyceae and Rhodophyceae.—W. H. Emig.

2842. PAX, F. Die fossile Flora von Uesküb in Mazedonien. [The fossil flora of Uesküb in Macedonia.] Bot. Jahrb. 57: 302-319. 1921.—The paper is based on collections made by Dr. Gripp in 1918 and includes about 35 named species and several yet unnamed, belonging to the following families: Taxaceae, Pinaceae, Typhaceae, Gramineae, Myricaceae, Juglandaceae, Betulaceae, Fagaceae, Magnoliaceae, Lauraceae, Hamamelidaceae, Leguminosae, Simarubaceae, Anacardiaceae, Aquifoliaceae, Celastraceae, Aceraceae, Rhamnaceae, Ericaceae, and Oleaceae. No new forms are described. The relation of this to other Tertiary floras is discussed, this flora probably belonging to the Miocene. The fossil flora of Uesküb represents the remains of a forest vegetation of which trees and a few shrubs only were preserved. Of the herbs nothing is known except in the case of *Typha* and a few remains of grasses. The climate was comparable to that of warmer East Asia and warmer North America. The occurrence of leathery leaves suggests a warm climate. The flora shows a strong relationship with the present flora of North America and East Asia, but is little related to that of Eurasia and the Mediterranean. A few cases show a slight affinity with tropical floras. The affinities are similar to those shown for other European Tertiary floras. The flora is a mixture of Engler's arcto-tertiary and tertiaryboreales elements. Several species are noted which have probably sprung from corresponding species of the Tertiary in the same region, as for instance *Juglans regia* from *J. acuminata*, *Castanea sativa* from *C. atavia*, etc.—K. M. Wiegand.

2843. ROUND, EDA M. *Annularia* with *Paleostachya* fruit. Bot. Gaz. 73: 326-328. Fig. 2. 1922.—The author describes fruiting specimens of a new species, *Annularia Clarkii*, from the Rhode Island Coal basin, which shows that the *Paleostachya* type of cone is associated with the *Annularia* type of foliage, thus disproving the statement of Scott and some other writers on the subject.—E. W. Berry.

2844. T[OMAS], H. H. [Rev. of: ARBER, E. A. NEWELL. *Devonian floras: a study of the origin of Cormophyta*. 100 p., 47 fig. Cambridge University Press: 1921.] Jour. Botany 59: 357-358. 1921.

2845. WEIDENREICH, F. *Das Evolutionsproblem und der individuelle Gestaltungsanteil am Entwicklungsgeschehen*. [The problem of evolution and the individual form function in development.] J. Springer: Berlin, 1921. 48 marks.

2846. WIELAND, G. R. *Devonian plants*. Science 55: 427-428. 1922.

PATHOLOGY¹

FREDERICK V. RAND, *Editor*

LILLIAN C. CASH, *Assistant Editor*

(See also in this issue Entries 2072, 2120, 2127, 2135, 2139, 2151, 2152, 2164, 2165, 2181, 2183, 2213, 2224, 2241, 2246, 2273, 2334, 2351, 2356, 2367, 2374, 2383, 2385, 2388, 2411, 2419, 2429, 2445, 2459, 2496, 2499, 2504, 2505, 2510, 2511, 2520, 2526, 2535, 2567, 2617, 2639, 2665, 2679, 2680, 2681, 2682, 2683, 2684, 2686, 2692, 2701, 2710, 2719, 2720, 2740, 2746, 2759, 2773, 2820, 2826, 3066, 3074, 3076, 3080, 3084, 3086, 3098, 3099, 3105, 3106, 3110, 3114, 3115, 3121, 3158, 3161)

DISEASES CAUSED BY FUNGI

2847. ANONYMOUS. *Potatoes*.—Varieties immune from black scab or wart disease, 1921. Jour. Dept. Agric. Ireland 21: 477-482. 1921.—Certain immune varieties are considered with reference to their replacing common susceptible varieties.—Donald Folsom.

2848. ANONYMOUS. *Yellow-leaf disease of Phormium tenax*. [Abstract and discussion of: COCKAYNE, A. H. *Yellow-leaf disease of Phormium tenax*. New Zeal. Jour. Sci. and Tech. 4: 34-35 1921.] New Zealand Jour. Agric. 22: 297-298. 1921.—The fungus *Ramularia Phormii* was isolated and considered the probable cause of the disease.—N. J. Giddings.

2849. BLACKMAN, V. H. *The nature of immunity from wart disease*. Rept. Internat. Potato Conference. p. 92. Roy. Hort. Soc.: London, 1921 [1922].—Investigations are in progress but as yet there is no certain knowledge as to whether resistance depends on anatomical or physiological factors. It seems quite likely that susceptibility may depend on a balance or lack of balance between the physiological processes of the host cell and the parasite.—Frederick V. Rand.

2850. BOTTOMLEY, A. M. *Note on Urophlyctis Alfalfae on lucerne*. Jour. Dept. Agric. Union South Africa 4: 153-155. 1 fig. 1922.—The disease caused by *Urophlyctis Alfalfae* is described and its economic importance discussed in view of the restrictions recently imposed on the importation of lucerne seed into the Union.—E. M. Doidge.

¹The present subdivisions of this section are tentatively offered as pigeon-holes for pathological literature with the idea merely of facilitating the search for specific material and without deference to any particular pathological point of view.

2851. BOYCE, J. S. The dry-rot of incense cedar. U. S. Dept. Agric. Bull. 871. 58 p., 3 pl., 3 fig. 1920.—The importance of incense cedar (*Libocedrus decurrens* Torr.), total-loss factors, dry-rot and secondary rots, and relative importance and control of dry-rot are discussed.—The results of this study indicate that the classing of incense cedar as an inferior species for lumber is due to the uniformly high percentage of injury caused by the dry-rot fungus, *Polyporus amarus* Hedg. Dry-rot can be largely eliminated by intensive fire protection, but can not be entirely controlled in this way because of other mechanical injuries, such as pruning, lightning, and frost, which also open the way to infection.—*Frederick V. Rand.*

2852. BRERETON, W. LeGAY, C. O. HAMBLIN, AND W. B. STOKES. Black spot of pear and apple. Some orchard experiments. Agric. Gaz. New South Wales 33: 123-130. 3 fig. 1922.—The black spot of pear and apple caused by *Venturia inaequalis* (Cke.) Aderh., known in the U. S. A. as pear and apple scab, is found in Australia. The conidial or summer stage is very common in New South Wales and this article shows that the winter or ascospore stage is also present. Extensive spraying experiments were carried on in a commercial pear orchard with lime-sulphur and Bordeaux sprays. The former was found to be injurious. Bordeaux at a 6-4-50 strength (with lead arsenate) sprayed twice gave good control on the coast. Later trials with Bordeaux (6-4-80) also gave effective control. Methods of control of black spot on apple were not determined. Methods and results of spraying are tabulated in detail, and general control and spraying methods are outlined.—*L. R. Waldron.*

2853. BRIERLEY, WILLIAM B. Some research aspects of the wart disease problem. Rept. Internat. Potato Conference p. 93-104. Roy. Hort. Soc.: London, 1921 [1922].—Immune varieties, stability of host and of fungous parasite, nature of immunity to disease, relation between disease and external factors, and soil sterilization are discussed in relation to the wart disease.—Since many susceptible varieties yield heavier crops than corresponding immune varieties, and since many of the well known and popular varieties are susceptible, whereas the immune sorts are more restricted in their time of ripening and often poorer in quality, the problem of breeding better immune varieties is still a live one.—Deterioration of yield in northern grown seed in the south may occur, but no authentic case is known of a breaking down in their distinctive quality of varieties immune to wart disease. Since sexual fusion occurs in the fungus, there would appear to be no certainty of germinal stability, and until the vital question of the genetic stability of fungi and bacteria is settled there is no absolute security of tenure for immune varieties.—The immune varieties are divided discontinuously from the others; the former are a homogeneous body, whereas the latter show a continuous range from high resistance to complete susceptibility, depending on germinal potentialities and environmental conditions. The suggestion is strong of the presence of some perfectly specific substance which is an integral factor in the metabolic structure of the immune varieties; while the differing susceptibilities of the other group might indicate a structural basis such as differential thickness or tensile strength of the cuticle or turgidity of the cell.—Can cultural treatment increase the resistance of susceptible varieties or retard the physiological activities of the fungus?—The only safe and final solution of the wart disease problem is the killing of the causal organism. Extensive soil sterilization experiments are being conducted at Rothamsted and Ormskirk.—*Frederick V. Rand.*

2854. BROWN, WILLIAM. Studies in the physiology of parasitism. VIII. On the exosmosis of nutrient substances from the host tissue into the infection drop. Ann. Botany 36: 101-120. 1 fig. 1922.—The passive exosmosis of nutrient material from the host cells through the cuticle into the infection drop is an important factor in the infective power of some fungi. In *Botrytis* the incidence of attack of beans is dependent on whether sufficient nutrient material is present in the infection drop to enable the fungus to germinate and penetrate the cuticular layer. In all the tests made it was found that drops of water when laid on the surface of plant structures showed an increase of conductivity which in several instances was accompanied by an increased capacity for stimulating germination.—*Lillian C. Cash.*

2855. BURK. Versuche mit der Saatbeize "Segetan I." [Experiments with "Segetan I" as a seed treatment against smut.] Fühling's Landw. Zeitg. 70: 471-475. 1921.—New liquid fungicides, Segetan I, an ammonium compound of organic and inorganic acid salts of copper with cyanide of mercury, and Segetan II, an ammonium compound of organic and inorganic salts of copper with cyanide of silver, were tested as seed treatments for wheat smut caused by *Tilletia Tritici*. Both materials were found to be fully effective and did not injure the seed.—A. T. Wiancko.

2856. CERASOLI, ERCOLE. Intorno alla solubilizzazione dei composti cuprici anticrittogamici sulla superficie degli organi verdi della vite. [The solubility of fungicidal copper compounds on the surface of green parts of grape vines.] Riv. Patol. Veg. 11: 70-72. 1921.—When grape foliage attacked by *Peronospora* and sprayed or dusted with Bordeaux mixture was immersed in distilled water it gave the latter an acid reaction whereas healthy leaves so treated did not.—F. M. Blodgett.

2857. CHEVALIER, AUG. Sur une maladie des agaves. [Concerning a disease of the agave.] Rev. Bot. Appl. 1: 21-23. 1921.—Brown, elliptic spots which had been noticed for a long time on the lower leaves of sisal (*Agave rigida* Mill.), and also on the leaves of *A. americana* L., in French Indo China, the French Sudan, and southeastern France, proved to be caused by *Colletotrichum agaves* Cavara. Removing and burning the affected leaves is recommended.—P. G. Russell.

2858. CIFERRI, R. Sul parassitismo secondario dell' "Aspergillus varians" Wehm. e un parassita di esso. [On the secondary parasitism of *Aspergillus varians* Wehm. and a parasite of the latter.] Riv. Patol. Veg. 11: 89-93. 1921.—*Aspergillus varians* was found growing on kernels of maize that had developed on the extremities of ears of plants growing in soil of low humidity. *Cephalosporium acremonium* Corda was frequently found as a parasite on the *Aspergillus*.—F. M. Blodgett.

2859. CIFERRI, R. Un intenso attacco del "Rhytisma acerinum" (Pers.) Fr. alle foglie d'*Acer campestre*. [A severe attack of *Rhytisma acerinum* on the foliage of *Acer campestre*.] Riv. Patol. Veg. 11: 93-95. 1921.—In the province of Macerata where living trees are used to support grape vines there occurred a severe outbreak of the disease caused by *Rhytisma acerinum* on the foliage of *Acer campestre*. Considerable losses resulted from the death of the trees and the loss of the leaves, which are used for forage. The disease was not controlled either by dustings with sulphur or by spraying with Bordeaux mixture. The disease was epidemic only in a limited humid zone.—F. M. Blodgett.

2860. CIFERRI, R. Una nuova malattia del pomodoro: la "carie." [A new rot disease of the tomato.] Riv. Patol. Veg. 11: 65-69. 1921.—A fungus belonging to the genus *Phoma* but differing from other *Phomas* described on the host was found on decaying tomatoes. Successful inoculations were made using spores scraped from the tomato or the infected pulp. The fungus is named *Phoma ferrarisii* n. sp. A *Ramularia* was also found in these fruits.—F. M. Blodgett.

2861. CIFERRI, R. Una nuova malattia della *Buddleia variabilis* dovuta alla *Phyllosticta Montemartinii* n. sp. [A new disease of *Buddleia variabilis* due to *Phyllosticta Montemartinii* n. sp.] Riv. Patol. Veg. 11: 114-115. 1921.—*Phyllosticta Montemartinii* n. sp. is described as causing a leaf spot on *Buddleia variabilis*, which is grown as an ornamental plant and as a source of nectar.—F. M. Blodgett.

2862. DETWILER, S. B. Blister rust appears in the Puget Sound region. Amer. Forestry 28: 97-98. 1 map. 1922.

2863. DONKIN, J. E. Bunt-resistant wheat. Jour. Dept. Agric. Union South Africa 4: 561-563. 1922.—Of 20 varieties of wheat tested for resistance to bunt, caused by *Tilletia Triticici*, the durum, polonicum, and turgidum types showed evident resistance, but these are not first class milling wheats.—E. M. Doidge.

2864. DUCOMET, VITAL. Oïdium de la pomme de terre et Oïdium de la betterave. [Oidium on potato and beet.] Bull. Soc. Path. Vég. France 8: 153-154. 1921.—*Erysiphe cichoracearum* DC.? attacks the following varieties of potato in the west of France: l'Industrie, The Factor, Majestic, and Saucisse. Institut de Beauvais is resistant.—Another undetermined Oidium attacks beets.—Jean Dufrenoy.

2865. DUFRÉNOY, J. Les fanaisons de plantes par les *Fusarium*. [Blighting of plants by *Fusarium* spp.] Rev. Bot. Appl. 1: 239, 240. 1921.—This is a review of a number of recent papers on wilts and blights caused by *Fusarium* spp.—P. G. Russell.

2866. DURRELL, L. W., AND JOHN H. PARKER. Comparative resistance of varieties of oats to crown and stem rusts. Iowa Agric. Exp. Sta. Res. Bull. 62. 27-56. 1920.—Some 200 lots of oats were tested for rust resistance from 1914 to 1918. The oats were artificially infected both in field and greenhouse, and the degree of rust was estimated according to the scale used by the U. S. Department of Agriculture. Infection was most satisfactorily produced by dusting the spores on wetted leaves by means of a blower. The greater susceptibility of seedlings to rust attack is pronounced, and the growth and maturity of rust is more rapid on young than on older plants. There is, within limits, a direct ratio between the number of spores applied to a leaf and the amount of infection obtained.—Varieties of the red-oat group, *Avena sterilis*, showed more resistance to crown rust than those of the common oat group, *A. sativa*. Apparently more varieties of oats are resistant to crown than to stem rust, though but few are extremely resistant to crown rust when subjected to a severe epidemic. White and Green Russian, Ruakura, and *A. barbata*, *A. orientalis mutica*, and *A. sativa grisea* show a high degree of resistance to stem rust under rust nursery conditions. Only *A. sativa* and varieties Green Russian and Ruakura were markedly resistant to both rusts.—A study of the effect of time of seeding on degree of infection indicates that crown rust infection is greater on the earlier sown oats, and stem rust infection is slightly greater on later seedings.—Florence S. Willey.

2867. EARLE, F. S. Sugar cane root disease. Jour. Dept. Agric. Porto Rico 4: 3-27. 1920.—The symptoms of the serious root rot disease of sugar cane in Porto Rico are lack of vigor, yellowing and rolling of the blades, occurrence of top rot, development of the rind disease, and failure to ratoon. The rotting of the roots is attributed to certain facultative parasites which the author refers to as various species of *Rhizoctonia* and a species of *Pythium*. A strict parasite of a myxomycetous nature was found rather consistently within the vascular bundles of affected cane. It is thought that this organism lowers the vitality of the host and that this enables the facultative parasite to attack the plant, thus giving rise to the top rot and rind disease. Extensive varietal experiments show a wide difference in resistance to root rot, varying from practical immunity in Kavangire and the North India canes to high susceptibility in Otaheite.—Geo. H. Dungan.

2868. ELLIOTT, JOHN A. A new *Ascochyta* disease of cotton. Arkansas Agric. Exp. Sta. Bull. 178. 18 p., 4 pl., 1 fig. 1922.—The disease appeared as a destructive blight following a period of continued rainfall. It begins as a leaf spot and spreads rapidly to all aerial parts of the plant, and under favorable conditions assumes the form of a blight on cotton plants comparable to "fire blight" on pears.—The causative organism was easily isolated and numerous successful inoculations were obtained. Inoculations by means of spore suspensions were possible only under conditions of high humidity, and the advance of the disease was checked completely by dry weather.—The fungus mycelium advances through the host tissues by mechanical penetration. The formation of pycnidia closely follows the advance of the

mycelium, the life cycle being completed in 5-6 days. The fungus was found to live over winter as a saprophyte on dead cotton stalks in the field and to infect the young cotton plants the following spring. Crop rotation is suggested as a means of control. Circumstantial evidence indicates that the disease is restricted to the region in which it was found.—W. B. Grove identified the fungus as *Ascochyta Gossypii* Sydow.—*John A. Elliott.*

2869. ERIKSSON, JAKOB. The life of *Puccinia Malvacearum* Mont. within the host plant and on its surface. *Phytopathology* 11: 459-463. 1921.—Extracts from the results of several years work with hollyhock rust are given under 3 headings, as follows: diseased and sound hollyhock races, watering of the culture soil with fungicides, and germination of the spores. It was found that infection may be divided into 2 periods, the 1st or summer stage (May-July) and the 2nd or autumn stage (July-October). During the 1st period no infection occurred on a sound race, although the plants were growing near plants of a badly diseased race; but after July infection became severe on all plants in the experiment. By watering plants of a diseased race with copper sulphate solutions of various concentrations the amount of rust developing during the summer period was reduced. But the sulphate had no apparent effect during the autumn period. Although all the spores of this rust are 2-celled, they are biologically of 2 types. In germination, the summer spores always send out long germ tubes from the ends of which conidia are abstracted. These conidia, when placed on a hollyhock leaf, empty their protoplasm into a host cell from which it passes into the interior cells of the leaf as mycoplasma; but pustules are not produced immediately. The autumn type of spores when germinated in moist air or on the surface of water produce promycelium and sporidia which infect the host by means of a germ tube and produce pustules in 8-10 days. If submerged in water the autumn spores germinate in a manner similar to that of the summer spores.—*B. B. Higgins.*

2870. ERIKSSON, JAKOB. The mycoplasma theory—is it dispensable or not? *Phytopathology* 11: 385-388. 1921.—Studies on seed infection by the grain rusts by Pritchard, Beauverie, and Hungerford are discussed briefly. The results of attempts to obtain seedling infection from the sorus-bearing seed are negative, and therefore the hypothesis that the intraseminal sori constitute a mode of hibernation for the rust fungus must be abandoned.—A brief description is given of the structure and the transition into mycelium of the mycoplasma of *Phytophthora infestans* (Mont.) deBary and of *Peronospora Spinaciae* (Grev.) Laub. In both cases it can be detected first as a finely granular colloidal mixture of the protoplasm from host and parasite, existing symbiotically in the host cell. Later the mycoplasma assumes an antibiotic phase; the nucleus, plastids, and other elements of the host protoplasm are destroyed; and the mycoplasma is then ripe and ready to issue forth as mycelium.—The existence of a mycoplasma symbiosis stage in the life history of several other parasitic fungi is suggested.—*B. B. Higgins.*

2871. ERWIN, A.T. Controlling downy mildew of lettuce. *Iowa Agric. Exp. Sta. Bull.* 196. 307-328. 1921.—Downy mildew of lettuce, caused by *Bremia Lactucae*, is increased by cloudy weather. The fungus may develop on wild lettuce, hence plants in the vicinity of forcing houses should be destroyed. Well ventilated houses and dry foliage are important to check the growth and spread of the disease. Since downy mildew is usually a seedling disease, control measures should be effected during the early stages. Bordeaux mixture (4-4-50) is recommended for control, 2-3 applications being necessary.—*Florence S. Willey.*

2872. FARIS, JAMES A. Violet root rot (*Rhizoctonia crocorum* DC.) in the United States. *Phytopathology* 11: 412-423. 1921.—*Rhizoctonia crocorum* DC. was studied on the Irish potato. The fungus forms a dense mat of mycelium, usually violet colored, which often tends to form strands over the underground parts of the plants. From this superficial mycelium infection threads are pushed between the cells of young or soft tissues such as the eyes of tubers. These internal hyphae pass through the intercellular spaces of the cortex. They occasionally enter a cell cavity and, branching profusely, initiate the so-called infection cushions. Previous work with the fungus is summarized.—*B. B. Higgins.*

2873. GARD, MÉDÉRIC. A propos de la germination des conidies du mildiou de la vigne (*Plasmopara viticola* (Berk. et Cur.) Berl. et de Toni.). [Germination of conidia in mildew of the vine.] Bull. Soc. Path. Vég. France 8: 130-131. 1921.—The conidia germinate well at the surface of the water. Covered with a film in a drop of water or submitted to violent agitation the conidia do not germinate.—*Jean Dufrenoy.*

2874. HAMBLIN, C. O. "Foot rot" of wheat caused by the fungus *Helminthosporium*. Agric. Gaz. New South Wales 33: 13-19. 7 fig. 1922.—In 1921 damage caused by this disease in New South Wales varied from 2 or 3 up to 85 and 90 per cent, probably far more damage than from the well-known take-all. The macroscopic appearance of the 2 diseases is similar but a field distinction can generally be made. Symptoms produced by "foot rot" are similar to those of the *Helminthosporium* disease described from the U. S. A. Measures of control suggested are better rotation methods, use of bare fallow, early seed bed preparation, use of good seed, and use of superphosphate. A scientific report of the disease is promised.—*L. R. Waldron.*

2875. HARTLEY, CARL. Damping-off in forest nurseries. U. S. Dept. Agric. Bull. 934. 99 p., 1 pl., 20 fig. 1921.—Among the phases of the subject discussed are damping-off in general; damping-off of conifers, including the relative importance of several causal fungi; damping-off fungi as causes of root-rot and late damping-off; and the relation of environmental factors such as density of sowing, moisture and temperature, and chemical and biological factors.—In nurseries damping-off is caused mainly by seedling parasites non-specialized as to host; *Pythium Debaryanum* Hesse and *Corticium vagum* B. & C. are probably the most important of these. *Fusarium* spp., *Rheosporangium aphanidermatus* Edson, *Phytophthora* spp., *Pythium artotrogus* (Mont.) De Bary, and *Botrytis cinerea* Pers. are also discussed in their relation to damping-off. The most serious losses in conifers are usually from the root-rot type of damping-off. Of the different conifers, reports are available as to the susceptibility of 63 species. The best control method appears to be the disinfectant treatment of the seed-bed soil before or immediately after the seed is sown. For conifers sulphuric acid has been found very useful.—*Frederick V. Rand.*

2876. HAYES, H. K., and E. C. STAKMAN. Resistance of barley to *Helminthosporium sativum* P. K. B. Phytopathology 11: 405-411. 1921.—Previous studies of varietal resistance of barley (*Hordeum* sp.) to the spot blotch disease (caused by *Helminthosporium sativum*) show that Manchuria barley is fairly resistant and a high-yielding variety. However, its rough awns are objectionable and attempts are being made, by crossing this variety with Lyon, a smooth-awned and very susceptible variety, to produce a high-yielding and smooth-awned variety resistant to the disease. Several smooth-awned F₃ families from this cross have shown considerable resistance.—*B. B. Higgins.*

2877. HEINSEN, E. Das Auftreten und die Verbreitung des Tomatenkrebses bei Hamburg. [The appearance and distribution of tomato canker at Hamburg.] Zeitschr. Pflanzenkrankh. 31: 16-18. 1921.—The tomato canker, caused by *Didymella Lycopersici* Kleb. (*Ascochyta Lycopersici* Brun.) caused serious damage in the region of Hamburg where 50-70 per cent of the plants had succumbed or were dying. The fungus first appeared in 1919 about the setting time of the fruit. In well ventilated spots the damage was less severe. Cold wet weather was found to favor the fungus. Attempts to control the disease by removal of all diseased plants showed no favorable results. The author records having observed 5-50 dead plants surrounded by perfectly healthy ones though the reason the latter remained unattacked was not apparent. In April, 1920, the disease was observed in the seed beds. Infected plants showed blackening of the stem just above or just below the surface of the ground. The author suggests means by which control might be expected, and promises further information.—*H. T. Güssow.*

2878. HOLLRUNG. Das Lauwasserbad als Entbrandungsmittel. [The warm water bath as a means of destroying smut.] Fühling's Landw. Zeitg. 70: 96-110. 1921.—Several varieties

of wheat and barley were subjected to warm water treatments for loose smut. Each variety was subjected to 3 different treatments, namely: 24 hour's immersion in water at 30°C., 4 hours at 40°, and 1 hour at 45°. Germination tests were then made, including percentage germination, strength of germination, and length of sprouts at the end of 7 days in sand cultures. Different varieties behaved somewhat differently. In general the best results were secured by treating the seed for 1 hour at 45°C.—A. T. Wiancko.

2879. HORI, S. Outbreak of the blister blight of tea on Sizuoka tea plantation. Ann. Phytopath. Soc. Japan. 14: 69-70. 1921. [Text in Japanese.]—In the Sizuoka Prefecture the blister blight of tea caused by *Exobasidium vexans* Mass. has broken out yearly since 1919 and its damage seems to be very great. The author discusses his observations on the disease and states that control measures involve (1) the destruction of diseased plants by burning, and (2) spraying with Bordeaux mixture or lime-sulphur.—Takewo Hemmi.

2880. HORI, S. Pink-disease on the Unsiu orange in the Miyazaki Prefecture. Ann. Phytopath. Soc. Japan 14: 67-69. 1921. [Text in Japanese.]—This brief report of the author's observation on the symptoms of the disease, which was found recently in the Miyazaki Prefecture, includes some discussion of the control measures. The disease, caused by *Corticium salmonicolor* B. & Br., is serious also in Formosa and the Philippine Islands.—Takewo Hemmi.

2881. HORI, S. Witches' broom of Paulownia in the vicinity of Tokyo. Ann. Phytopath. Soc. Japan 14: 70-71. 1921. [Text in Japanese.]—The witches' broom of *Paulownia tomentosa* (Thunb.) Steud. caused by *Gloeosporium Kawakamii* Miyabe is a well-known disease in the island of Kiushu in southern Japan. The author, who had never heard of the severe injury due to this disease in the vicinity of Tokyo, had his attention called in the spring of 1921 to an outbreak at Shimura near Tokyo, where the numerous young trees planted in 1919 were affected seriously. Briefly discussing his observations, the author points out the fact that the affected trees had heretofore scarcely shown the typical symptoms of "witches' broom" in the vicinity of Tokyo. The spray of copper emulsion was recommended as a control measure.—Takewo Hemmi.

2882. JONES, FRED REUEL. The leaf-spot diseases of alfalfa and red clover caused by the fungi *Pseudopeziza Medicaginis* and *Pseudopeziza Trifolii*, respectively. U. S. Dept. Agric. Bull. 759. 38 p., 3 pl., 5 fig. 1919.—Descriptions of the 2 diseases and discussion of their economic importance and host plants are followed by a detailed account of the taxonomy, morphology and cultural characters, physiology and pathogenicity, and studies of the life histories of the causal organisms.—One of the most important diseases of alfalfa is the leaf-spot caused by the fungus *Pseudopeziza Medicaginis* (Lib.) Sacc. A similar but less important leaf-spot of red clover is caused by the fungus *Pseudopeziza Trifolii* (Biv.-Bern.) Fckl. Both were obtained in pure culture and studied from various angles. Since cross inoculations from 1 host to another uniformly failed and both morphological and physiological differences were found, the author feels justified in retaining the fungi as distinct species. None of the imperfect fungi formerly regarded as a stage in the development of these fungi has been found to be related, and apparently only the ascospore form occurs in nature. The fungi live over winter on dead leaves which escape decay, and ascospores produced in spring furnish the source of new infection.—Frederick V. Rand.

2883. MAFFEI, LUIGI. Una malattia delle foglie del "Kaki" dovuta al *Colletotrichum kaki* n. sp. [A disease of the foliage of "Kaki" due to *Colletotrichum kaki* n. sp.] Riv. Patol. Veg. 11: 116-118. 1921.—*Colletotrichum kaki* is described as causing a leaf spot of *Diospyros kaki* L. var. *kiombo* cultivated in the botanical garden at Pavia. A disease caused by *Gloeosporium kaki* Seiya Ito was found on the fruits and the author proposes to determine whether the 2 diseases are caused by the same fungus.—F. M. Blodgett.

2884. MARTIN, J. F., G. F. GRAVATT, and G. B. POSEY. Treatment of ornamental white pines infected with blister rust. U. S. Dept. Agric. Circ. 177. 20 p., 12 fig. 1921.—This compilation on the causal fungus (*Cronartium ribicola* Fischer), symptoms, and control is written especially for those interested in ornamental white pines.—*L. R. Hesler*.

2885. MATZ, J. Investigations of root disease of sugar cane. Jour. Dept. Agric. Porto Rico 4: 28–40. Fig. 1–6. 1920.—Isolation and inoculation experiments show that species of *Rhizoctonia* and *Pythium* are actively concerned in causing root rot of sugar cane. *Marasmius Sacchari* Wak., *Odontia saccharicola* Burt., and a species of *Trichoderma* gave negative results. A 2nd form of *Rhizoctonia* is described. These organisms are common in the soils of Porto Rico, but the environment as well as the condition of the seed piece greatly influence their parasitic severity.—*Geo. H. Dungan*.

2886. MÜLLER, H. C., E. MOLZ, und D. SCHRÖDER. Weitere dreijährige Versuche zur Bekämpfung der durch *Pleospora trichostoma* (*Helminthosporium gramineum*) hervorgerufenen Streifenkrankheit der Gerste. [Further three-year trials in the control of a stripe disease of barley caused by *Pleospora trichostoma* (*Helminthosporium gramineum*).] Fühl-ing's Landw. Zeitg. 69: 321–331. 1920.—The disease appears on winter barley and is frequently observed first on the young leaves in late autumn as long, light colored stripes and later as brownish spots or stripes, which, however, may not be very noticeable until the following spring after the plants have headed. At this time the dark brown stripes are very marked and are accompanied by shredding of the leaves. The disease is especially noticeable at the beginning of grain formation, when affected plants begin to dry up and fall while healthy plants are still green. Many of the affected plants do not head out. Earlier trial of control measures were reported in Landw. Jahrb. [see Bot. Absts. 3, Entry 2710]. Results of seed treatment trials extending over 3 seasons, 1917–1920, are reported here. Materials used were formaldehyde (40 per cent), copper sulphate, upsulun, corbin, fusariol, sublumoform, preparation Ko. 6 of the Sacharin factory, Magdeburg, and preparation 777. The tabulated results show the effect upon germination, stand of plants, and percentage of diseased plants. In badly affected cases Ko. 6 was the only completely satisfactory remedy. In cases of moderate attack corbin and upsulun were reasonably satisfactory. Copper sulphate was also effective but injured the stand of plants. Formaldehyde, fusariol, and sublumoform were useless.—*A. T. Wiancko*.

2887. OPITZ, OBERSTEIN, und LEIPZIGER. Kritische Betrachtungen zur Fusariumkrankheit des Wintersaatgetreides. [Critical observations regarding the Fusarium disease of the seed of winter grains.] Landw. Versuchssta 97: 219–244. 1920.—In an effort to determine the effect of Fusarium infection of seed grains of winter wheat and winter rye, infected and disease-free seeds were germinated in the laboratory and in the field. No consistent differences were observed. Both showed about the same germination and early growth. Treatment of Fusarium-infected seed with sublumoform, fusariol, and upsulun showed no consistent beneficial effect. Observations on larger fields showed a favorable effect upon germination and early growth in some cases but during later development the untreated seed caught up with the treated and the results at harvest were about equal. Trials should be repeated to determine satisfactorily whether or not treatment of the seed is beneficial, as conditions were not such as to test thoroughly the effect of treatment upon survival through a severe winter.—*A. T. Wiancko*.

2888. PALM, B. T. The false mildew of tobacco introduced into the United States from the Dutch East Indies. Phytopathology 11: 430–432. 1921.—In regard to the suggestion of Smith and McKenney that *Peronospora Hyoscyami* de Bary may have been introduced into the U. S. A. on mats imported from Sumatra, it is stated that this fungus has never been found on tobacco in the Dutch East Indies. It therefore seems very doubtful that it could have been introduced in this way.—*B. B. Higgins*.

2889. PETHYBRIDGE, GEORGE H. Some recent work on the potato blight. Rept. Internat. Potato Conference. p. 112-126. Roy. Hort. Soc.: London, 1921 [1922].—The accounts of studies of *Phytophthora infestans* by various investigators are briefly reviewed from the admirable early paper of Rev. M. J. Berkeley published in 1846 down to some of the most recent work.—The author and his collaborators found that the oogonium at an early stage penetrates the antheridium at or near the base, grows up through it and emerges at the summit when it swells out rather rapidly forming a spherical portion in which develops an oosphere which becomes finally a thickened oospore. In pure culture on Quaker oat agar oospores often developed parthenogenetically in oogonia, apparently the change in nutrition acting as a stimulus. Thus far germination of oospores has not been seen, and these reproductive bodies have been obtained only in pure culture.—Control measures are reviewed and discussed, including spraying with copper sprays and the use of resistant varieties. Resistance to blight appears to diminish in the course of years. From the small amount of work done it seems probable that resistance is not of a mechanical nature but due to the presence of some substance in the cells which inhibits the development of the fungus.—*Frederick V. Rand.*

2890. PETTEY, F. W. The spraying of fruit trees. Jour. Dept. Agric. Union South Africa 3: 264-270. 1921.—This is a program for spraying pear and apple orchards in the coastal regions of the western province for the control of insect pests and *Fusicladium*. For complete control 10 sprayings with lime-sulphur are recommended.—*E. M. Doidge.*

2891. PEYRONEL, BENIAMINO. Il marciume amaro o marciume del cuore delle mele e delle pere. [A core rot of apple and pear.] Boll. Mens. R. Staz. Patol. Veg. Roma 2: 23-27. 1921.—Apples and pears in various parts of Italy are affected internally with a decay which begins about the core as a pale reddish discoloration and extends as a dry rot causing mummification. The causal fungus, *Tricothecium roseum* Lk. seems to gain entrance through the calyx end. The practice of placing the fruits with calyx end down seems to increase chances for infection, probably because of the increased humidity in the calyx cup.—*D. Reddick.*

2892. POOLE, R. FRANK. The Sclerotinia rot of celery. New Jersey Agric. Exp. Sta. Bull. 359. 27 p., 15 fig. 1922.—This is a semi-technical paper dealing with the damping-off disease of celery, due to *Sclerotinia libertiana*, in greenhouse soils in the muck farm areas where nearly total destruction was obvious in some houses about planting time in April. The life cycle of the fungus in greenhouses, and the sources of infection were worked out in detail. The relation of the disease on different hosts is also given. A satisfactory control was obtained by replacing infected soils with new soils on which lettuce had not been grown and also by sterilizing the infected soils with formaldehyde.—*Mel. T. Cook.*

2893. PRITCHARD, FRED J. Development of wilt resistant tomatoes. U. S. Dept. Agric. Bull. 1015. 18 p., 10 pl. 1922.—The characteristics and distribution of the disease, sources of soil infection, and persistence of the fungus in the soil are discussed. Use of wilt resistant varieties is the only successful means of controlling the disease. A high degree of soil infection was artificially maintained and resistant strains improved by further individual selections. After the 2nd selection no improvement was noticeable. The Marvel, Columbia, Norton, and Arlington varieties developed by the author, and Louisiana Red, Louisiana Pink, and Tennessee A 16-2 proved resistant to wilt and suitable for commercial purposes. Only a few commercial varieties showed resistance. Once established, wilt-resistance appears to be a fixed character. With 1 exception, the results of tests with wilt resistant varieties showed the same favorable results in all sections of the country.—*John A. Elliott.*

2894. PRITCHARD, F. J., AND W. S. PORTE. Effect of fertilizers and lime on control of tomato leaf spot (*Septoria Lycopersici*). Phytopathology 11: 433-445. Fig. 1-16. 1921.—The effect of different quantities and ratios of sodium nitrate, potassium sulphate, acid phosphate, air slaked lime, and copper sulphate on the infection of tomatoes by *Septoria Lycopersici* Speg. was studied. The tests were made in pots in the greenhouse. The fungus

spores were applied as evenly as possible with a compressed air sprayer. The number of infections per plant were counted, and the relative susceptibility then obtained by comparing the number of spots per unit of leaf area. The leaf area per plant in each series was estimated by taking the average of the measured leaf area of 3 plants from that series. No fertilizer or combination of the fertilizers tried seemed to affect the susceptibility when compared on this basis. The number of infections per plant was much higher in the rapidly growing plants of the nitrate and the potash series, but the number per unit of leaf area was not appreciably increased.—*B. B. Higgins.*

2895. PUTTERILL, V. A. Plant diseases in the Western Province. III. *Fusicladium* or scab of the pear and apple. Jour. Dept. Agric. Union South Africa 3: 343-352. Fig. 1-6. 1921.—An account is given of the occurrence and prevalence of this disease in the Western Province, and a spraying schedule suggested for its control.—*E. M. Doidge.*

2896. RHODES, ARTHUR S. The pathology of *Lupinus arboreus*, with special reference to the decays caused by two wound-parasites—*Collybia velutipes* and *Pleurotus ostreatus*. Phytopathology 11: 389-404. Pl. 18-20. 1921.—The economic importance of *Lupinus arboreus* Sims, an evergreen shrub or small tree which grows abundantly on sand dunes about San Francisco, lies in its value as a soil retainer. The plants are attacked by several insect and fungus pests, which are listed. They are also attacked by 2 wood-rotting fungi, *Collybia velutipes* (Curt.) Quél. and *Pleurotus ostreatus* (Jacq.) Quél. not formerly reported. Both are wound parasites, entering the trunk or roots at wounds made by borers or mice, or at other injuries. During the rainy season sporophores are abundantly produced from points on the trunk or roots of both dead and living infected trees. A detailed comparison of healthy wood with that decayed by each of the fungi shows that their action is almost identical.—*B. B. Higgins.*

2897. RIVERA, VINCENZO. Osservazioni sopra la moria dei mandorli prodotta dal *Fomes fulvus*. [On the death of almond trees caused by *F. fulvus*.] Boll. Mens. R. Staz. Patol. Veg. Roma 2: 28-29. 1921.—Trees assume an aged and sickly appearance, the older branches and finally the whole tree die. The fungus breaks out on the surface. The wood is blackened and becomes entirely worthless, and the bark and medullary rays are converted into a yellowish substance.—Young trees, used to replace dead ones, die but it is thought that their death is caused by substances left by the dead roots rather than by infection.—*D. Reddick.*

2898. ROSEN, H. R. *Septoria glume blotch of wheat*. Arkansas Agric. Exp. Sta. Bull. 175. 17 p., 4 fig. 1921.—This disease has been described under various names in Europe, and several American writers mention a spotting of wheat glumes associated with a *Septoria*. Townsend found the disease very destructive in Maryland in 1898. In northwestern Arkansas the disease did considerable damage, particularly to the red winter wheats. The fungus was isolated and successful inoculation obtained on wheat leaves and glumes. The organism was originally described by Berkeley as *Septoria nodorum* Berk. Kuehn, without considering Berkeley's work, gave it the name *Phoma Hennebergii* Kuehn, which was transferred to *Macrophoma* by Berlèse and Voglino. Passerini described the fungus as *Septoria glumarum*. The author reduces these 3 to synonyms of *Septoria nodorum* Berk. and also considers *Septoria fusispora* Died. and *Ascochyta graminicola* Sacc. in part as probable synonyms.—*John A. Elliott.*

2899. SALAMAN, R. N., AND J. W. LESLEY. Some information on the heredity of immunity from wart disease. Rept. Internat. Potato Conference. p. 105-111. Roy. Hort. Soc.: London, 1921 [1922].—The results of experiments to determine whether immunity is controlled by Mendelian factors appear to indicate that immunity is of 2 kinds, one depending on a factor Y, the other on a factor X. X and Y are independent and in any immune variety 1 or both must be present. Susceptibility also is of 2 kinds, that due merely to the absence of both the immunity factors X and Y, and that due to an inhibitor of immunity, B. A plant of the

latter class may contain the immunity factor Y but not X.—The evidence also suggests that it is the factorial composition of the respective parents which is important, though which acts as mother and which as father is immaterial.—An immune homozygous plant was not found but there is no *a priori* reason to believe that such will not be found or that it may not be isolated by appropriate experiment.—*Frederick V. Rand.*

2900. STÖHR, K. Über das Verhalten von Gerstensorten gegen Heiszwasserbeize. [Behavior of different varieties of barley towards the hot water treatment of seed.] *Fühling's Landw. Zeitg.* 70: 384-395. 1921.—The question is raised as to whether seed germination of barley varieties is differently affected by the hot water treatment of seed for loose smut caused by *Ustilago nuda*. Four methods of hot water treatment and 8 barley varieties were tested. The barley varieties were: Mahndorfer Hanna, Heines Goldthrope, Bensings Imperial, Rindlinger, Hintertuxer, Zeiners Franken, Bestehorns, and Svalofs Swan-neck. The hot water treatment methods used were: (1) Jensen's method,—soaking for 4 hours at 18–20°C, leaving for 4 hours in a saturated atmosphere, then dipping for 5 minutes at 52–53°C.; (2) the method of Larsen and Mortensen,—treating 3 hours at 18–20°C., 10 hours in saturated atmosphere, and 5 minutes at 49–50°C.; (3) Spieckermann's method,—2 hours at 45°C.; (4) the method used in the agricultural high school at Hohenheim,—soaking 46 hours at ordinary temperature, then 2 hours at 45°C. In each case the treated seed was dried back to its original weight before subjecting to germination test; the latter was made 1st by the regular filter paper and sand methods and later under field conditions. In all cases the filter paper method gave higher results than the sand method. The field trials showed that the results in the sand germinator were substantially correct for practical purposes. The Jensen and Larsen-Mortensen methods showed very little injury to the seed. The Spieckermann method gave considerable injury and the Hohenheim method was so injurious as to make it worthless. Some of the varieties stood the treatments better than others but varied under the different treatments, showing that variety and condition of seed should be taken into account and that careful germination tests should be made after treatment.—*A. T. Wiancko.*

2901. THOMAS, R. C. Disease notes of 1921; outlook for next season. *Monthly Bull. Ohio Agric. Exp. Sta.* 6: 153-157. 1921.—The failure of the apple crop accounted for the fact that less attention was given to disease control than normally. Apple scab was very serious. Losses due to black rot were very severe in certain sections and apple blotch has pushed much farther north. Because of these facts apple disease control for 1922 is very likely to be more difficult. Nothing short of a full spray schedule should be provided for.—*R. C. Thomas.*

2902. VINCENS, F. Maladie rose et chancre des branches sur *Hevea brasiliensis*. [Pink disease of *Hevea brasiliensis*.] *Bull. Agric. Inst. Sci. Saigon* 3: 321-331. 1920.—The author discusses the disease caused by *Corticium salmonicolor* B. & Br., and methods of treatment. It is said to be the most serious disease of *Hevea* in Indo-China.—*E. D. Merrill.*

2903. WELLES, C. G. *Cercospora* leaf spot of coffee. *Philippine Jour. Sci.* 19: 741-745. Pl. 1. 1921.—The causal organism, *Cercospora coffeicola* B. & C., is described and figured as it occurs on *Coffea bukovensis*. Control methods are indicated.—*E. D. Merrill.*

2904. WESTON, WILLIAM, H., JR. The occurrence of wheat downy mildew in the United States. U. S. Dept. Agric. Dept. Circ. 186. 6 p. 1921.—This disease, caused by *Sclerospora macrospora* Saccardo, has long been recognized in Europe, but has been unknown in the U. S. A. until recently when it was found in Tennessee and Kentucky. It is not as yet damaging, although it is destructive in Europe. The pathogen is restricted to poorly drained fields or portions of fields. There are indications that the parasite has been here for many years. It was found on wheat and on the grass *Bromus commutatus* Schrad. Diseased plants show excessive tillering, browning of the tips, short internodes, and yellow, thickened leaves. In Italy it is found on wheat, corn, oats, barley, rice, and several wild grasses. Four Italian references are appended.—*L. R. Hesler.*

2905. ZELLER, S. M., AND C. E. OWENS. European canker on the Pacific slope. *Phytopathology* 11: 464-468. *Fig. 1-4*. 1921.—The European canker caused by *Nectria galligena* Bres. has been found during recent years on several varieties of apples in Oregon and adjoining regions of the Pacific Northwest. The cankers spread very rapidly and lack the concentric callus formation reported for cankers produced by the fungus in Europe and eastern America. The cankers spread several inches or even 1-2 feet during a single season. This rapid and continuous growth is probably due to the humid atmosphere and mild climate on the Pacific Coast.—*B. B. Higgins*.

DISEASES CAUSED BY BACTERIA

2906. GLOYER, W. O. Bacterial blight of beans under field conditions. [Abstract.] *Absts. Bact.* 6: 40. 1922.

2907. LEE, H. ATHERTON. Citrus-canker control: A progress report of experiments. *Philippine Jour. Sci.* 19: 129-173. *Pl. 1-2*. 1921.—Citrus canker prevention experiments have been inaugurated in the Philippines because the quarantine regulations promulgated to permit entire eradication of the disease would not allow such experiments in the U. S. A. The experiments have shown that fungicides such as Bordeaux 4-4-50 mixture, neutral Bordeaux mixture, and Burgundy mixture effected tangible reductions in the amounts of citrus canker. Other factors which may be utilized to minimize canker infection were found to be: removal of sources of infection by pruning and drastic "clean up" sprays; stimulation of foliage growth to occur at periods unfavorable to canker dissemination or development; control of violent winds by windbreaks; and the control of chewing insects. The most important factor in considering control is the wide variation in susceptibility of the various *Citrus* species and varieties. A feasible control on such extremely susceptible hosts as the grapefruit or lime varieties is not practical. On the other hand control on the Mandarin oranges, citrons, kumquats, and calamondins is scarcely necessary. The species of intermediate susceptibility need further experiments to warrant a definite statement. Attempts at complete elimination of canker by pruning and spraying without total destruction of the host indicate that this is apparently feasible on the less susceptible but not on the more susceptible hosts.—*E. D. Merrill*.

2908. LEVINE, MICHAEL. Studies on plant cancers III. The nature of the soil as a determining factor in the health of the beet, *Beta vulgaris*, and its relation to the size and weight of the crown gall produced by inoculation with *Bacterium tumefaciens*. *Amer. Jour. Bot.* 8: 507-525. *9 fig.* 1921.—Beets were grown in soils of different degrees of fertility, both in pots and in the field, and a part of the plants were inoculated early with *Bacterium tumefaciens*. The plants grown in good soil were naturally larger than those in poor soil, and it was found that, in general, the larger the beet, the larger the crown gall produced upon it and *vice versa*. This seems to indicate that "a well nourished, vigorously growing and healthy host responds to the invasion of a parasite by a hypertrophy and a hyperplasia which are greater than result in the case of a poorly nourished or feebly growing host." Similar results in other plants are mentioned and the significance of these facts for plant pathology discussed.—*E. W. Sinnott*.

2909. MELHUS, I. E., AND T. J. MANEY. A study of the control of crown gall on apple grafts in the nursery. *Iowa Agric. Exp. Sta. Res. Bull.* 69. 159-172. 1921.—A study of preventive measures for crown gall of apple grafts has been attempted since, due to its pathogenicity, curative measures are futile. Infection of apple grafts may be produced by dipping the grafts into a viable bouillon culture of *Bacterium tumefaciens*. The scion is more readily infected than the stock. All grafts seemed equally susceptible. Crown gall infection is facilitated by a large amount of string over the union of the graft. This is undesirable also on account of girdling and excessive callousing. Cloth wrapped about the union decreased the amount of crown gall. An increased amount of infection was not noted when the scion wood was cut from trees infected with crown gall at the union. When hairy root seedlings were

used as stock, the latter remained infected in most cases, but the hairy root was not transmitted to the scion.—Surface disinfection with formaldehyde (0.16 per cent), copper sulphate (0.25 per cent), and mercuric chloride (0.1 per cent) was injurious to the callousing apple grafts. A less injurious effect was produced by fungicides, which go into solution slowly, such as lead arsenate and Bordeaux mixture. A strong Bordeaux mixture (25–25–50) tended to have a preserving action on the string and decreased the stand. More dilute Bordeaux mixtures did not reduce the stand and proved nearly as beneficial in reducing crown gall as the stronger mixtures. The use of Bordeaux mixture (8–8–50) with or without lead arsenate reduced the percentage of crown gall about 66 per cent over the checks. The addition of lead arsenate or soaps increased its toxic effect and its adhesiveness.—*Florence S. Willey.*

2910. POOLE, ROBERT F. Celery disease investigations. Ann. Rept. New Jersey Agric. Exp. Sta. 41: 608–609. Pl. 2–3. 1920.—A progress report is given of investigations on the root rot of celery caused by *Bacillus carotovorus*. Brief accounts are given of the results of soil treatments, none of which are very effective in the control of the disease. Moisture and temperature conditions were found important in relation to prevalence and loss. Transplanting in order to develop a large root system before setting seedlings into infected soils, was found beneficial. While green varieties were practically resistant, a certain amount of infection was found. Some cultural characteristics of the isolated *Bacillus carotovorus* are appended.—*Mel. T. Cook.*

2911. POOLE, ROBERT F. Horseradish root rot investigations. Ann. Rept. New Jersey Agric. Exp. Sta. 41: 610. Pl. 4., fig. 2. 1920.—A bacterial root rot of horseradish has been reported in Passaic County. The disease is well distributed in the growing district. A wilting of severely diseased plants is symptomatic. The organism generally attacks the core, causing a yellow, water-soaked rot which is sometimes soft. The core of older roots become blackened and hollow. A brief account of other organisms isolated from diseased roots and a tentative outline of contemplated investigations are given.—*Mel. T. Cook.*

2912. RAND, FREDERICK V., AND ELLA M. A. ENLWS. Bacterial wilt of cucurbits. U. S. Dept. Agric. Bull. 828. 43 p., 4 pl., 10 fig.. 1920.—The wilt disease of cucurbits caused by *Bacillus tracheiphilus* EFS. occurs in 31 states and affects cucumbers, cantaloupes, summer and winter squashes, and pumpkins, but not watermelons under field conditions. Its severity has been found to vary in different seasons and localities with an occasional wilted plant up to 75–95 per cent of the crop. There is very little direct relation between percentage of infection or severity of the disease and ordinary weather conditions in the North, but there is a direct relation to prevalence of cucumber beetles and condition of vigor in the host plant. Extensive experiments have shown that infection does not come through soil or seed; that several species of insects are not wilt carriers; but that both the striped cucumber beetle (*Diabrotica vittata* Fab.) and the 12-spotted cucumber beetle (*D. duodecimpunctata* Oliv.) are summer carriers and probably the only means of summer transmission of the disease in the localities studied. The causal organism has been carried experimentally for 6 weeks by striped cucumber beetles hibernated artificially in cold storage. Considerable strong circumstantial evidence is given which points to cucumber beetles as winter carriers.—In extensive virulence tests the various isolations of *Bacillus tracheiphilus* from different hosts and localities have shown wide and fairly constant differences in relative virulence to a given host variety. Cucumbers were the most susceptible host species studied and watermelons the most resistant.—As a result of experimental trials, spraying with strong Bordeaux mixture and lead arsenate powder (4–5–50–2), the planting of trap crops where the beetles can be poisoned, and the pulling of wilted vines during the early part of the season are recommended as control measures.—*Lillian C. Cash.*

INFECTIOUS CHLOROSES (MOSAIC AND PEACH YELLOWS GROUPS, ETC.)

2913. BLAKE, M. A., MEL. T. COOK, and C. H. CONNORS. Recent studies on peach yellows and little peach. New Jersey Agric. Exp. Sta. Bull. 356. 62 p., 2 pl. 1921.—The authors

discuss the distribution, losses, symptoms, and recent studies on these 2 diseases. Pits from trees in which either disease is well advanced fail to grow, but those from slightly diseased trees may grow. The diseases are transmitted by budding even though the buds die; also by small fragments of living bark placed under the bark of a healthy tree. They are not carried by juice from diseased trees or by pollen. The period of incubation is variable. Variations in both diseased and healthy trees are discussed.—*Mel. T. Cook.*

2914. BRANDES, E. W. The mosaic disease of sugar-cane and other grasses. U. S. Dept. Agric. Bull. 829. 26 p., 1 pl. (colored), 5 fig. 1919.—A brief account of the history of sugar cane or grass mosaic, including losses due to the disease and its distribution in the U. S. A. and other countries, is given. Symptoms are described and illustrated. A discussion of susceptible and immune varieties of sugar cane discloses that only a few varieties are free from attack. Evidence is presented to show that 4 other species of grasses are susceptible to the sugar cane mosaic. The results of 1 experiment indicate that the disease is not seed-borne in the case of sorghum. Preliminary greenhouse experiments show that the disease can be prevented by excluding insects. It is suggested that where the disease is present in small amount it can be controlled by rogueing, since the living diseased plant is the only known source of inoculum. Where the infection is heavy it is necessary to grind all cane and plow out the stubble to eradicate the disease. If all diseased plants have been killed, healthy "seed" can be planted immediately without danger of infection. Planting of immune varieties is suggested.—*E. W. Brandes.*

2915. BRUNER, S. C. Algunas observaciones sobre la enfermedad del "Mosaico" o "Rayas Amarillas" de la caña de azúcar. [Some observations on the "mosaic" or "yellow streak" disease of sugar cane.] Rev. Agric. Com. y Trab. [Cuba] 4: 616-620. 3 pl. 1921.—A review of the reported effects of this disease on various cane varieties in Porto Rico, Hawaii, and Jamaica is given. Synonymy of varietal nomenclature is discussed. Experiments were conducted to test the effects of the disease on the more important Cuban varieties with particular reference to Cristalina, the best and most important variety. Final conclusions are avoided, though a preliminary classification in regard to susceptibility is made. The following varieties are considered susceptible: Morada, Yellow Caledonia, Blanca, B. 1753, B. 208, B. 630, B. 6450, D. 376, D. 604, D. 108, D. 99, and certain varieties of "Cuba" (produced by the Cuban Agronomic Experiment Station). The following varieties are considered resistant: Cinta, Tibboo Mird, Caña de la Tierra, Papoa, Burra, Vituahala, White Bamboo, D. 74, H. 109, B. 306, B. 247, T. 77, B. 3347, and certain varieties of "Cuba." Cristalina seemed to possess a high degree of resistance.—*G. R. Hoerner.*

2916. COTTON, A. D. The situation with regard to leaf-curl and mosaic in Britain. Rept. Internat. Potato Conference. p. 153-168. Roy. Hort. Soc.: London, 1921 [1922].—Observations and experiments in England tend to confirm the discoveries of Dutch and American workers. In leaf-curl (leaf roll) a 50-60 per cent reduction in yield is reported from affected seed. Marked varietal susceptibility is manifested and probably no variety is immune to either disease. These diseases are less prevalent in the northern and upland areas of Great Britain. The comparative freedom from these troubles in some sections is believed due mainly to milder or later attacks of the virus-carrying aphids. Relations to environmental conditions are described and it is shown that "deterioration" as ordinarily understood is not a purely physiological phenomenon but a definite infection by a virus disease.—Practical directions for control are given.—*Frederick V. Rand.*

2917. DOOLITTLE, S. P. The mosaic disease of cucurbits. U. S. Dept. Agric. Bull. 879. 69 p., 10 pl., (pl. 3 col.) 1920.—Results of investigations as to the nature, transmission, and overwintering of infectious mosaic of cucurbits are given, together with the history of the disease, its geographical distribution and economic importance, host plants affected, and methods of control. The gross symptoms and pathological anatomy of the host are given in some detail, and careful studies of the causal contagium are described. No visible

causal organism has been associated with cucurbit mosaic, and the disease appears to be unrelated to soil conditions. The juice of mosaic plants contains an infective principle, however, which, as far as determined, possesses many of the properties of a living organism. This infective principle was found to be entirely removed by passage of the expressed juices through porcelain filters of the finer grades. The melon aphid (*Aphis gossypii* Glover) and the striped and 12-spotted cucumber beetles (*Diabrotica vittata* Fabr. and *D. duodecimpunctata* Oliv.) are the insects most concerned in the summer dissemination of this disease. The infective principle does not overwinter in the soil, but in some cases infection possibly takes place from the seed.—*Frederick V. Rand.*

2918. DUFRENOY, JEAN. Les maladies de pomme de terre dans les Hautes-Pyrénées. [Diseases of potatoes in the Pyrenees.] Bull. Soc. Path. Vég. France 8: 137-138. 1921.—Leaf roll and mosaic were observed on potatoes growing at an altitude of nearly 5,000 feet.—*Jean Dufrenoy.*

2919. FOËX, ET. Enroulement et leptonécrose. [Leaf roll and phloem necrosis.] Bull. Soc. Path. Vég. France 8: 148-149. 1921.—In specimens received by Foëx, Quanjer observed necrosis of the phloem in petioles of potato affected with leaf roll but not in those of plants attacked by other diseases (mosaic, crinkle, Duke of York mosaic, Aucuba mosaic).—*Jean Dufrenoy.*

2920. MURPHY, PAUL A. Some recent work on leaf-roll and mosaic. Rept. Internat. Potato Conference. p. 145-152, 1 pl. Roy. Hort. Soc.: London, 1921 [1922].—This paper discusses the occurrence of these 2 diseases in Ireland, field experiments in Ireland, the effect of leaf roll on starch translocation, the effect of climate on mosaic, the probable nature of mosaic diseases, the nature of "rust," the relation of crinkle to mosaic and rust, and practical control measures, including lists of resistant and susceptible varieties.—*Frederick V. Rand.*

2921. PATCH, EDITH M. Rose bushes in relation to potato culture. Maine Agric. Exp. Sta. Bull. 303. 321-344, fig. 50. 1921.—Studies of the pink and green aphid (*Macrosiphum solanifolii* Ashmead), agent of transmission of mosaic and leaf roll of Irish potatoes, indicate that it overwinters in Maine only in the egg stage and on rose bushes. The eradication or treatment of rose bushes to eliminate this agent and thus to reduce the spread of these diseases is considered practical in some localities and is recommended.—*Donald Folsom.*

2922. QUANJER, H. M. New work on leaf-curl and allied diseases in Holland. Rept. Internat. Potato Conference. p. 127-145, pl. 1-6. Roy. Hort. Soc.: London, 1921 [1922].—The so-called "deterioration" or "hereditary" diseases are discussed.—Symptoms of leaf roll and mosaic are given and experiments with insect transmission detailed. Aphids previously fed on diseased plants always caused infection in healthy plants. Those fed on healthy plants did not. These tests were carried out in insect-proof greenhouses and the progeny of all plants used in insect tests were observed in order to render the results conclusive. The more the climate favors the development of aphids, the farther infection is carried under field conditions.—Marginal leaf roll, in which rolling is restricted to the borders, is less common than true leaf roll. There is no phloem necrosis and starch transport is very little disturbed. Whether it is infectious is not known.—Aucuba mosaic is characterized by more prominent but more localized yellow patches than in ordinary mosaic. It does relatively little harm but is infectious and may be communicated to various solanaceous plants some of which do not show symptoms of disease but act as carriers. Duke of York mosaic is also mentioned, and crinkle is discussed in some detail.—Several pages deal with preventive measures.—*Frederick V. Rand.*

2923. SALAMAN, REDCLIFFE N. Degeneration of potatoes. Rept. Internat. Potato Conference. p. 79-91. Roy. Hort. Soc.: London, 1921 [1922].—A review of conclusions of early workers on so-called degeneration in potatoes is followed by the author's data tending

to show that degeneration is not due to senility or "running out" of vegetatively propagated varieties, but that it is a symptom of disease and that this disease is probably mosaic, which for generations has been masquerading under the name "curl."—The well established fact that immature seed potatoes are preferable to mature ones is possibly due to the circumstance that, being immature, they have escaped infection from the parent stock.—The best method is probably breeding potatoes with a view to immunity to mosaic and, if possible, to leaf roll also. "In a word, immunity to mosaic is the key to immortality—for the potato."—*Frederick V. Rand*.

2924. SEVERIN, HENRY H. P. Minimum incubation periods of causative agent of curly leaf in beet leafhopper and sugar beet. *Phytopathology* 11: 424-429. *Fig. 1-4*. 1921.—The beet leafhopper (*Eutettix tenella* Baker) is not a mechanical carrier of the causative agent of leaf curl. Non-infected leafhoppers, allowed to feed on diseased beet plants 1-10 minutes and then transferred immediately to healthy plants for a similar length of time did not produce the disease in any case. A certain period of incubation, which varies with the temperature and perhaps other factors, in the insect is required. The minimum period found experimentally was 4 hours. The minimum period of development in the beet plant, from time of infection until leafhoppers feeding on the plant became infected, was 5 days.—*B. B. Higgins*.

DISEASES OF UNKNOWN CAUSE

2925. HAMBLIN, C. O. Spotted wilt of tomatoes. *Agric. Gaz. New South Wales* 32: 50. 1921.—Field indications are that the disease is infectious, but actual transmission has not been observed nor has the writer been able to bring it about. No traces of fungi are in evidence and bacteria are not present in excessive numbers. Possibility of insect transmission has been considered but the few trials with insects resulted negatively. Lesions consist of epidermal collapse or collapse of superficial cell layers in patches. No treatment of value has been found.—*L. R. Waldron*.

2926. PUTTERILL, V. A. Plant diseases in the Western Province. II. Collar rot in orange trees. *Jour. Dept. Agric. Union South Africa* 3: 259-263. *Fig. 1-4*. 1921.—Collar rot or mal di gomma is a frequent trouble in seedling orange trees. The symptoms are described and remedial measures suggested.—*E. M. Doidge*.

2927. SCHWEITZER, PAUL. Untersuchungen über die Natur der filtrierbaren Vira und die Resistenz des Hühnerpestvirus gegen zellschädigende Einflüsse. [Investigation on the nature of filtrable viruses and on the resistance of the poultry pest virus to cell-destroying influences.] Dissertation, Basel, 20 p. 1921.

2928. SHARPLES, A., and J. LAMBOURNE. Observations in Malaya on bud-rot of coco-nuts. *Ann. Botany* 36: 55-70. *Pl. 1-7*. 1922.—The symptoms of bud-rot as described by investigators in both hemispheres are quoted and discussed.—In Malayan plantations the disease has been found only in isolated cases, usually widely separated except in 1 3-acre field where practically every tree was affected. Examination of a large number of specimens yielded several forms of bacteria but no obvious fungal hyphae. Stab inoculations were found to be unreliable in coco-nut tissue which is rich in easily converted food materials. If the bud tissue is a suitable medium for any saprophytic organism the latter will develop and cause the symptoms usually associated with bud-rot if inoculated directly into the bud tissue. This circumstance vitiates the results of much experimental work in determining the cause of bud-rot. Experimental results have indicated that all bud-rot diseases are attributable to 1 or more species of *Phytophthora*. These authors find *Phytophthora palmivora* Butler an obligate parasite on the tender leaves of most palms. However, it has not been demonstrated to cause a rotting of the "heart tissues."—*Lillian C. Cash*.

2929. SPIERENBURG, DINA. Een onbekende ziekte in de iepen. [An unknown disease of elm.] Verslag. en Mededeel. Plantenziektenk. Dienst Wageningen 24. 131 p., *pl. 1-4*. 1922.—This, the 2nd progress report on this subject, (the 1st report appeared in *Tijdschr. Plantenz.*

27: 53-60. 1921; also in Verslag. en Mededeel. Plantenziektenk. Dienst Wageningen 18. 10 p. 1921) states that numerous isolations from the discolored annual rings of the last 3 years have usually yielded cultures of *Cephalosporium* and *Graphium* spp., though in some cases other fungi also were isolated. The 1st form always passes to the 2nd under certain cultural conditions. It is thus considered certain that the 2 forms belong to the same fungus. Infection experiments so far have not given conclusive results, *i.e.*, the typical external symptoms of the disease have not appeared as the result of artificial infections, though the wood tissues of the infected branches show a distinct discoloration typical of the disease. This, however, has been more or less the case with several other fungi. The work is being continued.—*D. Atanasoff.*

DISEASES CAUSED BY ANIMAL PARASITES (INSECTS, NEMAS, PROTOZOANS, ETC.)

2930. BYARS, L. P. The nematode disease of wheat caused by *Tylenchus tritici*. U. S. Dept. Agric. Bull. 842. 40 p., 6 pl. (pl. 3 col.), 6 fig. 1920.—This serious disease of wheat, known in Europe since 1743 and due to the nematode *Tylenchus tritici* (Steinbuch) Bastian, has been found causing considerable damage in certain parts of the U. S. A., particularly in Virginia. Leaves of affected seedlings become wrinkled and distorted and may turn yellow, wilt, and die. Infected heads remain green longer than healthy spikes and the normal kernels are replaced by dark hard galls. Larvae inclosed in galls were killed by immersion in water at temperatures of 50, 52, 54, and 56°C. for 30, 20, 10, and 5 minutes respectively, provided the galls were thoroughly moistened before treatment. They were found highly resistant to the action of formaldehyde, mercuric chloride, copper sulphate, and sulphuric acid. Though primarily a parasite of wheat, to a less extent this nematode affects rye, oats, spelt, and emmer, and it has been reported on barley. Nematode-free seed may be obtained by floating off the galls in a 20 per cent salt solution and then treating the remaining wheat with water at a temperature of 50-52°C. for 10 minutes.—*Frederick V. Rand.*

2931. BYERS, L. P., and W. W. GILBERT. Soil disinfection with hot water to control the root-knot nematode and parasitic soil fungi. U. S. Dept. Agric. Bull. 818. 14 p., 5 pl. 1920.—It is experimentally shown here that the root-knot nematode (*Heterodera radicicola* (Greef.) Müller), *Rhizoctonia* sp., and *Pythium deBaryanum* Hesse can be eliminated from soil in 4-inch pots by submersion for 5 minutes in water at 98°C., and from 8-inch pots by application of 3,000 cc. of water at 98°C. These pathogenes are almost entirely destroyed in 8-inch pots by treatment with 2,000 cc. of boiling water and in shallow benches by boiling water at the rate of 7 gallons per cubic foot of soil. The effective treatments maintained a soil temperature above 55°C. for 30-60 minutes. Seed germination and size and vigor of plants were benefited by these treatments.—*Frederick V. Rand.*

2932. DAVIDSON, W. M., and R. L. NOUGARET. The grape Phylloxera in California. U. S. Dept. Agric. Bull. 903. 128 p., 11 pl. 10 fig. 1921.—The paper deals rather exhaustively with the history of *Phylloxera vitifoliae* Fitch in California, its methods of spread and present distribution in that state, the various details of vineyard destruction including pathological host symptoms, and with detailed life history and biological studies of the parasite.—*Frederick V. Rand.*

2933. DEWITZ, J. Befall verschiedener Rebensorten durch die Reblaus. [Attack on various grape varieties by Phylloxera.] Landw. Jahrb. 55: 513-530. 1921.—These notes, mostly for 1917-18, cover the degree of attack from *Phylloxera* suffered by varieties and hybrids of *Vitis*.—*A. J. Pieters.*

2934. FRANÇA, CARLOS. La flagellose des Euphorbes. II. [The flagellosis of Euphorbias.] Ann. Inst. Pasteur 34: 432-465. Pl. (col.) 13-14, fig. 1-2. 1920.—In this paper are described in detail the morphology and taxonomy of the flagellate *Leptomonas Davidi* found in the latex

of certain Euphorbias, its insect agents of transmission, its developmental cycle in both the insect and plant hosts, and the possible relationship between such plant flagellosis and diseases of similar causation in vertebrate animals.—In Portugal the transmitting agent is *Stenocephalus agilis* Scop. which is often found in nature with a high percentage of individuals parasitized.—Cage experiments demonstrated the transfer of *Leptomonas Davidi* between plant and insect. The flagellate lives over winter both in the hibernating bug, *Stenocephalus*, and in the latex of *Euphorbia*.—This paper is the second by França on the *Euphorbia* flagellosis. A third is promised.—A. Lafont was the first to open up this new field of research in phytopathology. [(1) Sur la présence d'un parasite de la classe des Flagellés dans le latex de *Euphorbia pilulifera*. Compt. Rend. Soc. Biol. Paris 66: 1011–1013. 1909; (2) Sur la présence d'un *Leptomonas* parasite de la classe des Flagellés dans le latex de trois Euphorbiacées. Ann. Inst. Pasteur 24: 205–209. Fig. 1–7. 1910; (3) Sur la transmission du *Leptomonas Davidi* des Euphorbes par un hemiptere, *Mysius euphorbiae*. Compt. Rend. Soc. Biol. Paris 70: 58–59. Fig. 1–7. 1911.] In addition to several other papers on this subject listed in França's bibliography should be included the one by Rodhain and Becquaeret [Rodhain, J. A., et J. Becquaeret. Présence de *Leptomonas* dans le latex d'une euphorbe congolaise. Bull. Soc. Path. Exot. 4: 198–199. 1911].—It is claimed, after briefly reviewing the work of Lafont and of Bouet and Roubaud, that these investigators have proved only that certain insects may convey infection from diseased to healthy plants, but not that these insects are the natural vectors of *Leptomonas Davidi*. The low percentage which they found parasitized, the absence of the flagellate in the salivary glands, and the negative results of experiments with insects taken in nature argue against *Nysius euphorbiae* and *Dieuches humilis* as the primitive hosts of the flagellate.—Frederick V. Rand.

2935. GALLI-VALERIO, B. La flagellose des Euphorbiacées en Suisse. (3^e contribution à l'adaptation des parasites.) [Flagellosis of Euphorbias in Switzerland. (3rd contribution on the adaptation of parasites).] Schweiz. Med. Wochenschr. 51: 1154–1156. 1921.—*Euphorbia* flagellosis has been reported from 16 localities and as affecting 17 species, all of which are tabulated here. Flagellosis is apparently not limited to this genus, since Migone has described a *Leptomonas elmassiani* in the latex of an *Asclepia* (*Araujia angustifolia*) in Paraguay [Migone, L. E. Un nouveau flagelle des plantes. *Leptomonas elmassiani*. Bull. Soc. Path. Exot. 9: 356. 1916. Review in Bull. Inst. Pasteur 14: 761–762. 1916.]—A review of the literature occupies a considerable portion of the present paper.—Signs of the disease in the plant host are given in some detail, and *Leptomonas Davidi* is described.—In the northern Alps at an altitude of about 1,300 m. the author found plants of *Euphorbia gerardiana* with the sucking insect *Stenocephalus agilis*. Examination revealed numerous typical flagellates in the latex. In the intestinal tract of 1 insect examined were found protozoa resembling the preflagellate and spherical stages but not the flagellate stage of *L. Davidi*.—The *Euphorbia* flagellosis is of great interest to vegetable pathology from several points of view, among which the author mentions the new idea of a protozoan flagellate as causing a plant disease, the transmission of infection by sucking arthropods which play the rôle of true intermediate hosts, the great analogy between the flagellosis of plants and of vertebrates, and the valuable information which may be gained from a study of these flagellosis relative to the subject of adaptation to parasitism.—Frederick V. Rand.

2936. LAVERAN, A., et G. FRANCHINI. Contribution à l'étude de la flagellose des Euphorbes. [Contribution to the study of flagellosis of Euphorbias.] Bull. Soc. Path. Exotique 13: 796–800. 1920.—Examination of the latex of 20 or more species of *Euphorbia* from 9 different cities of Italy gave evidence that this flagellosis is not infrequent in that country. At Bologna 5 out of 20 species examined were found parasitized. In 2 species the parasite was of abnormal form and without flagella. This raises the question whether 2 species of protozoans exist in Euphorbias.—The flagellosis was not found at Paris but the summer of 1920 was unfavorable to its development there.—White mice inoculated with the parasitized latex of *Euphorbia nereifolia* developed light infections.—Frederick V. Rand.

2937. LAVERAN, A., et G. FRANCHINI. Contribution à l'étude des insectes propagateurs de la flagellose des Euphorbes. [Contribution to the study of insect propagators of Euphorbia flagellosis.] Bull. Soc. Path. Exotique 14: 148-151. 1921.—A brief review is given of the work on *Euphorbia* flagellosis by Lafont, by Bouet and Roubaud, by Patton and Cragg, and by França. Careful studies by França seem to indicate that in Portugal *Stenocephalus agilis* is a true intermediate host of these flagellates. In order to test out this question for Italian conditions the contents of the intestinal tracts of about 200 insects collected on infected Euphorbias were carefully examined. Flagellates were found twice in *Nysius* sp. and twice in a non-determined member of the same family. Leishmaniform elements were seen in the digestive tube of *Calocoris*. In a smear mount from the digestive tract of 1 insect (probably *Nysius*) spirochaetes were found in large numbers. Since *Stenocephalus agilis* was lacking among these insects collected upon Euphorbias at Bologna it appears probable that other species of insects are capable of playing the rôle of intermediate host for these flagellates.—Frederick V. Rand.

2938. LAVERAN, A., et G. FRANCHINI. Spirochétose de punaises des Euphorbes et du latex [Spirochaetosis of bugs and of latex of Euphorbias.] Bull. Soc. Path. Exotique 14: 205-207. Fig. 1-2. 1921.—Some of the sucking insects, including *Nysius* sp., concerned in the transmission of *Euphorbia* flagellosis were found parasitized by spirochaetes. Shorter but otherwise similar spirochaetes were also found in the latex of Euphorbias. Furthermore, 2 species of bugs from *Sambucus nigra*, given as *Lygeus pratensis* and *Anthocoris sylvestris*, carried similar spirochaetes in their digestive tracts. It thus seems probable that in addition to the flagellosis there may be also a spirochaetosis of Euphorbias propagated as in the former case by certain species of sucking insects.—Frederick V. Rand.

2939. MESNIL, FÉLIX. La "flagellose" ou "leptomoniasé" des Euphorbes et des Asclépiadacées. [Flagellosis of Euphorbias and Asclepias.] Ann. Sci. Nat. Bot. X, 3: xlii-lvii. Fig. 1-4. 1921.—This paper comprises a comprehensive review of the published literature and includes a discussion of the species of *Euphorbia* parasitized, with their geographical distribution; the action of parasite on hosts; the morphology of the parasite, *Leptomonas Davidi* Lafont; the modes of transmission and the development of *Leptomonas* in Hemiptera of the genus *Stenocephalus*; the *Leptomonas* flagellates of *Asclepias*; and the affinities of this group of plant flagellates.—Lafont's early studies have been confirmed by many other workers in various parts of the world. There are listed 18 species of *Euphorbia* which have been reported as parasitized in various parts of Europe, Africa, and South America. The herbaceous species particularly are attacked. Affected parts become etiolated and stunted and finally wither and die. The latex becomes impoverished and starch grains disappear. The parasite is found in roots, stems, leaves, floral peduncles, and even in the capsullary envelope of the young fruits. The question of the diversity of insect vectors is perhaps related to a diversity of species of *Leptomonas* in Euphorbias, though this question is unsettled. This flagellate unquestionably belongs to the Trypanosomes. It will be of interest to know whether these parasites are not primitively flagellates of insects which have "strayed" into the plant habitat, there finding a suitable medium for growth.—Frederick V. Rand.

2940. PARKS, T. H., and E. E. CLAYTON. Controlling tipburn or hopperburn of potatoes. Monthly Bull. Ohio Agric. Exp. Sta. 6: 168-171. 1921.—The article reports an extensive demonstration for the control of tipburn or hopperburn of potatoes. Thirty-three farmers co-operated and approximately 200 acres were included in the tests. In many cases increases in yield of from 30 to 35 bushels per acre of sprayed over unsprayed were obtained. In 1 case there was an increase of 82 bushels. Of the varieties used Triumph was the most susceptible of the early varieties and Irish Cobbler the least. Of late varieties, Rural New Yorker displayed marked susceptibility whereas the Russet Rurals were more resistant.—R. C. Thomas.

2941. WINSTON, JOHN R. Tear-stain of Citrus fruits. U. S. Dept. Agric. Bull. 924. 12 p., 2 pl. 1921.—The author reviews the literature, describes the disease, and discusses cul-

tural, inoculation, and spraying experiments and histological studies. Cultural studies show that *Colletotrichum gloeosporioides* Penz. is not confined to the tear streaks, but is also almost invariably found on normally colored areas. Inoculations of this fungus on grapefruit at various stages of development failed to give any positive reaction. On the other hand, rust mites were very abundant in recently developed tear-streak patterns on grapefruit; and copper sprays alone tended to increase rather than reduce the trouble, while rust-mite applications of sulphur sprays practically eliminated tear-stain. Local and seasonal conditions of moisture and light that favor rust-mite injury also favor tear-stain. Practically all the so-called wither-tip tear-stain in Florida is associated with rust mites and can be readily controlled by controlling these mites.—*Frederick V. Rand.*

NON-PARASITIC DISEASES

2942. BEAUVERIE, J. Sur une soi-disant "maladie" ayant causé la perte de 45,000 semis de châtaigniers. [A so-called disease causing the loss of 45,000 chestnut seedlings.] Bull. Soc. Path. Vég. France 8: 127-129. 1921.—An excessive cutting of the germinating seedlings, following an empirical practice, in this particular season suppressed the growing tips, inhibited growth and caused the development of tumor-like tissue. This injury to the growing tip is considered due to the unusually advanced stage of germination attained at the time the stratified seed were removed for planting.—*Jean Dufrenoy.*

GENERAL AND MISCELLANEOUS PATHOLOGICAL LITERATURE

2943. ANONYMOUS. Legislazione fitopatologica. [Phytopathological legislation.] Boll. Mens. R. Staz. Patol. Veg. Roma 2: 37-42. 1921.—The text summarizes recent legislation in Italy for the inspection of American grape vines whether grown in Italy or imported, inspection and quarantine legislation for plants and seeds imported into Italy, and the inspection and movement of plants and seeds within the kingdom.—*D. Reddick.*

2944. ANONYMOUS. Spraying programs for the orchard and fruit garden. Monthly Bull. Ohio Agric. Exp. Sta. 7: 19-38. 1922.—This article, a revision of former spraying programs and spray formulae, gives brief, concise, and comprehensive directions for preparing all fungicides and insecticides in current use. Spraying programs in tabular form designate the time of application, materials to be used, and the diseases or insects to be controlled, and the relative values of different sprays, manner of application, and suggestions for avoidance of injuries due to the chemicals used are discussed.—*R. C. Thomas.*

2945. ANONYMOUS. Dusting versus spraying as factors in cleaner fruit. [Rev. of: WHETZEL, H. H. The present status of dusting. Proc. New York State Hort. Soc. 2: 45-76. 1920.] Agric. Gaz. New South Wales 33: 131-134. 1922.

2946. ALLEN, R. HAROLD. Annual report of the division of plant pest control. Ann. Rept. Massachusetts Dept. Agric. 2: 1-11. 1921.—This division is concerned with inspection of nurseries and control of the white pine blister rust and the European corn borer. Inspection of 154 nurseries has shown a very marked decrease of the San José scale during the past few years, and an increase of the oyster-shell scale. Blister rust has been practically eliminated from the nurseries. Gypsy moth and brown tail moth are prevalent in nurseries in the eastern part of the state.—Experiments have shown the European corn borer to be present on a large number of new hosts. This pest has been located in 126 towns.—The white pine blister rust is quite generally distributed. Control work has been in cooperation with the Bureau of Plant Industry of the U. S. Department of Agriculture. Recent extensive experiments have shown that the disease can be controlled by destroying all *Ribes* within 200-300 yards of pine. The State has expended \$301.25 (46¢ per bush) in compensation for *Ribes* destroyed in 1918 and 1919.—*J. K. Shaw.*

2947. ALLEN, W. J., Orchard experiments. Spraying trials at Glen Innes experiment farm. Agric. Gaz. New South Wales 33: 113-119. 1922.—Extensive spraying experiments

during 1920 and 1921 dealt with the following: (1) control of powdery mildew of apple, (2) control of apple black spot, (3) use of combined sprays to control both foregoing diseases, (4) damaging effect, if any, of various sprays applied at different strengths and periods, and (5) effects of lime-sulphur applied at various strengths in spring and summer on cherries and pears.—Results are given in detail. The combined spray, consisting of atomic sulphur, lime-sulphur and lead arsenate, to combat both powdery mildew and black spot, could not be tested as black spot was not present. It was found that Bordeaux mixture caused russetting damage if applied later than the "spur-bursting" stage. A total of 43 spraying trials were conducted. Results are tabulated.—*L. R. Waldron.*

2948. BERNHARD, HEINRICH. *Untersuchungen über die desinfizierende Wirkung einiger neuer Silberpräparate.* [Investigations concerning the disinfectant action of several new silver preparations.] Dissertation, Giessen. 19 p. 1920.

2949. CAULLERY, MAURICE. *Le parasitisme et la symbiose.* [Parasitism and symbiosis. 400 p., 53 fig., 30 p. bibliog. G. Doin: Paris, 1922.—This book, the result of a series of lectures delivered at the Sorbonne, is published as 1 section of the *Encyclopédie Scientifique*. Most of the examples are from the animal kingdom. Various phases of commensalism are discussed in the 1st portion of the book. The main body of the work deals with parasitism among different animal groups and includes phases of the subject such as temporary parasitism, adaptive modifications, parasitic specificity, the various modes of host infestation, and the like. Cecidology is briefly considered and 2 chapters deal respectively with animal and plant symbioses. Under the latter heading lichens, legume bacteria, and mycorrhizas are considered. The section concludes with the conception of N. Bernard: "La symbiose est à la frontière de la maladie." The concluding discussion concerns the general question: "Is symbiosis a primitive character of cellular life?"—*Frederick V. Rand.*

2950. COOK, MEL. T., and WM. H. MARTIN. *Potato diseases in New Jersey.* New Jersey Agric. Exp. Sta. Circ. 122. 39 p., 21 fig. 1921.—In this revision of circular 105, a brief discussion is given of the common diseases with the results of the potato-spraying tests to date.—*Mel. T. Cook.*

2951. COOK, MEL. T., and ROBERT F. POOLE. *Diseases of sweet potatoes.* New Jersey Agric. Exp. Sta. Circ. 123. 23 p., 17 fig. 1921.—This is a popular publication in which most of the important sweet potato diseases are described. Methods of control as far as known are given for each disease, with particular reference to the selection of seed as free as possible from all disease at digging time. Methods of treating and bedding the seed are given. Some importance is also attached to proper management of the hot-beds while growing the sprouts. A large number of cuts illustrating the principal diseases are given.—*Mel. T. Cook.*

2952. C[RAIG], C. F. *Medical pathology and applied therapeutics. Parasitic infections.* [Rev. of: SERGENT, EMILE, L. RIBADEAU-DUMAS, et L. BABONNEIX. *Traité de pathologie médicale et de thérapeutique appliquée.* Tome 14. *Infections parasitaires.* A. Maloine et Fils: Paris, 1921.] Absts. Bact. 5: 73. 1921.—"This is designated one of the best monographs upon parasitic infections." The last section of the book, by LOUIS RAYMOND, is devoted to the mycoses and is an excellent contribution to the subject.—*D. Reddick.*

2953. F., J. B. *Diseases of the rubber tree (Hevea brasiliensis Muell.).* [Rev. of: PETCH, T. *The diseases and pests of the rubber tree.* x + 273 p., 6 pl. Macmillan and Co.: London, 1921 (see Bot. Absts. 11, Entry 2961).] Nature 108: 524-525. 1921.—The book is "much more than a mere guide to the pests, animal and vegetable, that afflict *Hevea*. Its pages abound in acute observations and suggestions that make it valuable from the point of view of general pathology."—*O. A. Stevens.*

2954. FISCHER, W. *Pflanzenkrankheiten und Saatenanerkennung.* [Plant diseases and seed certification.] Mitteil. Deutsch. Landw. Ges. 37: 151-154. 1922.—The author calls

attention to the fact that fields on which certified seed is growing are not infrequently infected with diseases and urges stricter requirements. His remarks apply especially to barley and wheat.—A. J. Pieters.

2955. GUYOT. Notes de pathologie végétale. [Phytopathological notes.] Bull. Soc. Path. Vég. France 8: 132-136. 1921.—Brief notes as to the occurrence of *Cladosporium herbarum* on wheat, *Fusarium culmorum* on barley and oats, and *Urophlyctis Alfalfae* on alfalfa are followed by a more detailed account of a blight of elms occurring in Picardy in 1918. Certain of the branches lose their leaves and dry up; and the tissues of the later-formed annual rings show a browning of the walls and a deposition of small brown to black granules. The blighted elms present symptoms of defective nutrition.—Jean Dufrenoy.

2956. HORI, S. Preparation of copper emulsion. Phytopath. Soc. Japan 14: 43-52. 1921. [Text in Japanese.]—The author recommends the copper emulsion made of copper sulphate, soap, and water as a most excellent fungicide, which takes the place of Bordeaux mixture and is rather superior in various respects to the latter. The quantity of soap to be used varies with the quality and therefore previous to the preparation of the fungicide a suitable ratio of each soap to the copper sulphate must be decided by the following preliminary test. A 1 per cent solution of soap should be added in various amounts to a certain volume of a 1 per cent solution of copper sulphate and shaken thoroughly. The quantity of soap by which a light blue emulsion containing no precipitation or floating matter is made decides the most suitable ratio. Generally the quantity of soap is more than 3 times that of the copper sulphate.—According to the quantity of copper sulphate used, the author proposes the various formulae of the fungicide in Japanese measurements as in the case of Bordeaux mixture and recommends the 5 to 8 "Momme Shiki" for most diseases. This is made of 5 to 8 "Momme" of copper sulphate, a suitable quantity of soap determined by a preliminary test, and 1 "To" of water. (1 "Momme" = about $\frac{1}{16}$ pound; 1 "To" = about 4 gallons.) The author describes 2 practical methods of preparing the fungicide: (1) Dissolve the copper sulphate in 2 parts and the soap in 8 parts of water and mix; (2) dissolve the soap in a small amount of hot water. When the temperature goes down to about 80°C. put the copper sulphate crystals into the solution and stir it vigorously to make a concentrated copper emulsion. Add hot water to the emulsion until the volume designated by the formula is reached. The fungicide can be preserved for a while in a concentrated stock emulsion. The author also gives directions for making mixtures of varying strength from the stock emulsion.—Takewo Hemmi.

2957. JOHNSON, JAMES. The relation of air temperature to certain plant diseases. Phytopathology 11: 446-458. Pl. 21-23. 1921.—A series of chambers, in which the temperature and humidity of the air are automatically regulated, have been built in a greenhouse and used for studying the development of certain diseases in plants under definitely known conditions. The chambers are 4 × 4 × 4 feet with 3 sides and the bottom of wood, the 4th side and the top of glass. The chambers held at temperatures above that of the greenhouse are electrically heated and regulated. For lower temperatures a small brine system has been installed. A humidostat regulates the humidity by automatically starting and stopping a blower which forces saturated air into the chamber. Circulation of air within the chambers is maintained by electric fans. The efficiency of the system has been proved in preliminary studies of the temperature relations of mosaic disease of tobacco, bacterial leaf spot of tobacco caused by *Bacterium tabacum* Wolf & Foster, and late blight of potatoes caused by *Phytophthora infestans* (Mont.) deBary.—B. B. Higgins.

2958. MORSE, STERNE. The mathematical analysis of immune reactions. [Abstract.] Absts. Bact. 6: 30. 1922.

2959. NEIFERT, I. E., and G. L. GARRISON. Experiments on the toxic action of certain gases on insects, seeds, and fungi. U. S. Dept. Agric. Bull. 893. 16 p. 1920.—Of the gases tested, cyanogen chloride and chloropicrin gave promise of being useful for fumigation pur-

poses. Neither of these, however, can be used in greenhouse fumigation because of their injurious action on plants. They can probably be used in the fumigation of stored products. The results of numerous experiments with cyanogen chloride against fungi and bacteria on seeds indicate that this gas can be used against such organisms with success, but further studies are necessary to work out a practical application. Fumigation of seeds with saturated chloropicrin apparently stimulated the growth of rice and timothy and injured somewhat the seeds of alfalfa and radish. Other seeds tested showed no effects from the treatment.—*Frederick V. Rand.*

2960. ORTON, W. A. New work on potato diseases in America. Rept. Internat. Potato Conference. P. 109-179. Roy. Hort. Soc.: London, 1921 [1922].—This paper deals with the outstanding features of the potato disease situation in the U. S. A. and briefly covers malnutrition troubles, soil fungi, tuber rots, potato leak, bacterial potato diseases, potato wart, mosaic, and leaf roll.—Mosaic, perhaps the greatest pathological problem of the U. S. A., is transmitted through the tubers, by tuber and stem grafting, by introduction of juice from diseased to healthy plants, and by means of aphids. Investigations on control include roguing, spraying for insect carriers, isolating the seed plot, and production of resistant varieties.—Leaf roll occurs in all the seed-producing districts in the North as well as in the potato-growing sections of the South: but it occurs less generally in the seed-producing sections than mosaic.—*Frederick V. Rand.*

2961. PETCH, T. The diseases and pests of the rubber tree. x + 278 p., 6 pl. (col.), 38 fig. Macmillan and Co., Ltd.: London, 1921.—The author discusses in considerable detail diseases of the rubber tree, knowledge of which has been much extended since the publication by the same author in 1911 of *The Physiology and Diseases of Hevea brasiliensis*. As the book is intended primarily for the rubber planter, technical details have been omitted as far as possible, scientific descriptions of causal organisms being given in a separate chapter. A chapter on general sanitation deals with such topics as thinning, intercrops, cover plants, pruning, protection of wounds, and tree surgery. The diseases are treated under the headings of root diseases, leaf diseases, *Phytophthora* diseases, stem diseases, non-parasitic diseases, abnormalities, etc. In each case are given the causal organism if known, the geographical distribution, a careful description of the disease for identification by the planter, and measures for control. Numerous illustrations, many of them colored, add to the value of the book. Various mammal and insect pests are described. The injuries to prepared rubber by various fungus and bacterial organisms and the effect of Bordeaux mixture on rubber are discussed.—A bibliography gives a list of the more important papers on diseases of *Hevea* published since 1911, and those on pests published since the beginning of the plantation-rubber industry.—*Lillian C. Cash.*

2962. RIPPEL, AUGUST. Entwicklungs- und Ernährungszustand der Pflanzen in ihren Beziehungen zum Auftreten von parasitären Pflanzenkrankheiten. [Conditions of nourishment and growth of plants in their relation to attacks of parasitic diseases.] Fühling's Landw. Zeitg. 70: 428-435. 1921.—The author discusses the stages of development during which plants are most susceptible to attacks of parasitic diseases and the influence of the plant's nourishment on susceptibility. Plants are most susceptible to disease attacks while quite young and when fruit formation begins. At the latter stage the demands upon the energy of the plant are especially great and its resistance is therefore reduced.—Under-nourished plants are always susceptible. Over-nourishment, especially with nitrogen, favors an excessively sappy growth and brings about high moisture conditions both in the plant and around it, conditions which favor the development of most parasitic diseases. Moderately nourished plants are least susceptible. A sudden checking of the moisture supply after rapid growth weakens resistance. Phosphatic fertilizers, which hasten maturity, tend to lessen susceptibility. It is concluded that the farmer may strengthen the resistance of plants to parasitic diseases by properly regulating food and moisture supply.—*A. T. Wiancko.*

2963. SCHOEVEERS, T. A. C. *Bestrijding van tomatenziekten in Engeland.* [Controlling tomato disease in England.] Verslag. en Mededeel. Plantenziektenk. Dienst Wageningen 25. 16 p. 1922.—This is an abstract of the author's report of his 2 trips to England for studying the methods used there in controlling tomato diseases.—*D. Atanasoff.*

2964. SIMONETTO, MOISES. *Método profiláctico para impedir la generalización en el interior de la República de epidemias y plagas.* [A prophylactic method of checking the spread of epidemics and plagues into the interior of the Republic.] Rev. Agric. Com. y Trab. [Cuba] 4: 575. 1 fig. 1921.—Certain regulations are proposed for governing all shipments of seeds or plants into the interior of Cuba in order to prevent the spread of insects and diseases of plants.—*G. R. Hoerner.*

2965. TICE, C. *Seed-potato certification in British Columbia.* Potato Mag. 47: 6. 1921.—Rules for 1922 are given.—*Donald Folsom.*

2966. TRAVERSO, G. B. *Poltiglia bordelése senza rame?! [Bordeaux mixture without copper?!]* Bull. Mens. R. Staz. Patol. Veg. 2: 30-33. 1921.—This is a review and discussion of the work of Villedieu [see Bot. Absts. 9, Entry 529, 1576; also following entry] on fungicidal agents. This work needs to be confirmed as it is contrary to most previous experience.—*D. Reddick.*

2967. VILLEDIEU, et al. *Résumé des discussions sur la toxicité du cuivre.* [Summary of the discussions on copper toxicity.] Bull. Soc. Path. Vég. France. 8: 158-188. 1921.—Villedieu contends that the toxicity of copper sulphate is not so great as claimed by Millardet, because the zoospores of *Plasmopara viticola* (B. & C.) B. & de T. are able to live in a solution at 1 to 50,000; because in Bordeaux mixture calcium sulphate, copper hydrocarbonate, and basic copper sulphate are without action on the zoospores which swarm, live, and germinate in water containing these compounds; and because, on the contrary, lime possesses the same action as complete Bordeaux mixture and kills the spores. To summarize, he claims that if the mixture is acid it is the acid which is active; if alkaline, it is the lime. These assertions have been vigorously criticized by Bezssonoff, Blaringhem, and Molliard, who show (cf. Osterhout's studies) that the mixture of diluted salts, dissociated and taking the form of colloidal hydrates which constitute Bordeaux mixture, has, upon vegetation, an action which is not at all the sum of the actions of its constituents.—Mangin concludes that it is the copper salts which are efficacious in the best fungicides. [See also preceding entry.]—*Jean Dufrenoy.*

2968. WHITE, G. F. *Nosema-disease.* U. S. Dept. Agric. Bull. 780. 59 p., 4 pl., 7 fig. 1919.—*Nosema*-disease is an infectious disorder of adult bees caused by the attack of the protozoan, *Nosema apis* Zander, upon the walls of the stomach and occasionally those of the Malpighian tubules. Studies of the host-parasite relation and of the biology and life history of the parasite are given in detail. The paper is of interest to plant pathologists from the standpoint of technique as related to insect-transmitted diseases.—*Frederick V. Rand.*

2969. WOGLUM, R. S. *Fumigation of citrus plants with hydrocyanic gas: conditions influencing injury.* U. S. Dept. Agric. Bull. 907. 43 p., 4 pl., 1 fig. 1920.—The discussion includes the effect of hydrocyanic acid on plants; the effect on plant injury of temperature, light and moisture before, after, and during fumigation; the effect of concentration of the gas, length of exposure, physiological condition of the plant, and atmospheric and light conditions.—The optimum environment for safety to plants was found to be diffused light or darkness at uniform temperatures below 80°F. before, during, and after fumigation. Fumigation at temperatures above 80°F. is safest under cool prefumigation and postfumigation environments. Maximum injury follows high temperatures for all 3 environments. Trees in wet soil tend to be more severely injured than healthy trees in dry soil. A condition akin to hardness appears to be the optimum for gas resistance and is brought about by dryness of the soil, cold weather, and possibly by continuous very hot weather which exceeds the optimum for the plant. Sunshine fumigation can be conducted with safety by proper regulation of the dosage and length of exposure.—*Frederick V. Rand.*

PHARMACEUTICAL BOTANY AND PHARMACOGNOSY

H. W. YOUNGKEN, *Editor*E. N. GATHERCOAL, *Assistant Editor*

(See also in this issue Entries 2128, 2248, 2392, 2531, 2532, 3034, 3249, 3260, 3263)

2970. ANONYMOUS. Barks with a bite. *Sci. Amer. Monthly* 4: 217-220. 8 fig. 1921.—These brief descriptions of some of the trees and shrubs whose barks are used in medicine include notes on their preparation and manufacture into drugs.—*Chas. H. Otis*.

2971. ANONYMOUS. Sobre las propiedades medicinales de la peonía. [The medicinal properties of the peony.] *Rev. Agric. Com. y Trab. [Cuba]* 4: 591. 1921.—This is a brief account of *Abrus precatorius* L. (wild liquorice vine or Jamaica liquorice).—*G. R. Hoerner*.

2972. ANDRE, DUBOSE. Camphor and its synthesis. *American Druggist and Pharm. Rec.* 69: 44-46. 1921.—The early history of the camphor industry in Asiatic and European countries is given, and the work in camphor synthesis is briefly reviewed.—*C. M. Sterling*.

2973. BROWN, E. D. An undetermined principle obtained from poison ivy. *Proc. Soc. Exp. Biol. and Med.* 19: 136-137. 1921.—The author describes the properties of this substance and concludes that it is a glucoside, possibly belonging to the phenols. The principle was precipitated with lead acetate.—*M. M. Brooks*.

2974. BUTIGNOT, ED. Méfaits causés par le *Sarcosphaera coronaria* (Jacq.) Boud. [Injuries caused by *Sarcosphaera coronaria*.] *Bull. Trimest. Soc. Mycol. France* 37: 71-75. 1921.—After eating *Sarcosphaera coronaria* a family of 4 were made ill, 1 death resulting. Three other cases of poisoning by this form have been reported. It is recommended that its use in salad be avoided. This fungus is commonly considered edible.—*D. S. Welch*.

2975. CHAUVIN, E. Gastro-entérite causée par *Clitocybe nebularis*? [Gastro-enteritis caused by *Clitocybe nebularis*?] *Bull. Trimest. Soc. Mycol. France* 37: 70-71. 1921.—A singular case of mushroom poisoning caused by *Clitocybe nebularis* is reported. This form is commonly regarded as edible and this is the only record of its toxic effect which has come to the author's attention.—*D. S. Welch*.

2976. DUCLERGET, J. Contribution à l'étude des Valérianes. Étude comparative du *Valeriana officinalis* L. et du *Valeriana sambucifolia* Mik. [Contribution to the study of the valerians. Comparative study of *Valeriana officinalis* and *V. sambucifolia*.] *Bull. Sci. Pharm.* 28: 530. 1921.—Chemical and botanical data on these species are given and also the results of cultivating them in France.—*H. Engelhardt*.

2977. FERRIOL, G. Contribution à l'étude botanique et micrographique de l'*Artemisia Tournefortiana*. [Contribution to the botanical and micrographical study of *Artemisia Tournefortiana*.] *Bull. Sci. Pharm.* 28: 534. 1921.—This oriental plant, which grows in the neighborhood of Lyon, was compared with *Artemisia maritima* var. *pauciflora*. The plant does not contain santonin.—*H. Engelhardt*.

2978. GUNN, J. W. C. The action of *Eucomis undulata* Ait. *Trans. Roy. Soc. South Africa* 10: 1-4. 1921.—*Eucomis undulata* contains a sapo-glucoside which is a powerful haemolytic agent. It does not seem to be absorbed from the alimentary tract and only slowly from the subcutaneous tissues. It is toxic when injected intravenously, affecting the heart and the respiration. It is probably of no medicinal value.—*E. M. Doidge*.

2979. H., T. A. Medicinal chemicals. [Rev. of: BARROWCLIFF, M., and F. H. CARR. Organic medicinal chemicals (synthetic and natural). xiii + 331 p. Baillière, Tindall and

Cox: London, 1921.] *Nature* **109**: 37-38. 1922.—This is a compendium of methods of manufacture, useful to teachers and to those occupied in research.—*O. A. Stevens.*

1980. KRAEMER, HENRY. **Poison ivy—its poison and remedy.** *Amer. Druggist and Pharm. Rec.* **69**: 24-25. 2 fig. 1921.—The author, enumerating a number of poisonous plants which produce inflammations of the skin, describes poison ivy and its distinguishing characteristics. The dermatitis caused by poison ivy is described and a few preventives and remedies are given.—*C. M. Sterling.*

1981. KRAEMER, HENRY. **The wealth out of doors.** *Druggists Circ.* **65**: 453-454. 1921.—An experiment in collecting and marketing Stramonium is related.—*C. M. Sterling.*

1982. MARSH, C. D. **Poisonous plants of the western ranges.** *Jour. Amer. Vet. Med. Assoc.* **61**: 48-54. 1922.—This is a report of an address delivered before the American Veterinary Medical Association at Denver, Colorado, in September, 1921. It is a general account of the more common stock-poisoning plants of the western U. S. A., with brief descriptions of symptoms and preventive measures.—*C. D. Marsh.*

1983. MARSH, C. D., and A. B. CLAWSON. **The whorled milkweed (*Asclepias galioides*) as a poisonous plant.** *U. S. Dept. Agric. Bull.* **800**. 40 p., 3 pl., 36 fig. 1920.—The whorled milkweed growing in Colorado, Utah, New Mexico, and Arizona has been proved very poisonous to horses, cattle, and sheep. It has been identified as *Asclepias galioides* instead of *A. verticillata*, as cited in previous publications. The most marked symptoms are violent spasms. Autopsies and microscopical examinations show congestion of the peripheral blood vessels, the congestion being particularly marked in some glands, the lungs, and the central nervous system. Chemical examination of the plant has shown the presence of definite toxic compounds, some of which are glucosidal in nature. The authors claim no medicinal remedy gives satisfactory results. Prevention of poisoning can be accomplished by destroying the plants and care of stock to prevent hungry animals from coming into contact with masses of the weed.—*Heber W. Youngken.*

1984. MERCK, FRITZ. I. **Einwirkung v. Formaldehyd auf sekundäre Basen d. Pyrrolidin- u. Piperidinreihe.** II. **Ub. das Ormosin u. Ormosinin, zwei neue Alkaloide aus *Ormosia dasycarpa*.** [I. Influence of formaldehyde on secondary bases of pyrrolidin and the piperidin series. II. On ormosin and ormosinin, two new alkaloids from *Ormosia dasycarpa*.] *Diss. Freiburg i. B.* **8** vo., 43 p. 1920.

1985. McDONNELL, C. C., R. C. ROARK, and G. L. KEENAN. **Insect powder.** *U. S. Dept. Agric. Bull.* **824**. 100 p., 4 pl. 1920.—The Insecticide and Fungicide Board of the U. S. Department of Agriculture recognizes as insect powder one made from the powdered flower heads of *Chrysanthemum cinerariæfolium*, *C. roseum*, and *C. Marshallii*. The authors discuss the history, cultivation, harvesting, and preparation of the powder, its effect on insects and animals, and its adulteration. Substances which have been used to color and adulterate insect powder are listed, and physiologic, microscopic, and chemical methods for determining the genuineness of the powders are given. The presence and approximate percentage of stems may be determined by estimating the nitrogen, phosphorous, and crude fiber together with a qualitative ether-extract test (to determine color). The ash content is highest in closed flowers, next highest in open flowers, and lowest in stems. The analyst can determine whether open or closed flowers have been used in the following ways: (1) the presence of a large amount of pollen and the absence of fruit tissue indicate closed flowers; and conversely, little pollen and a large amount of fruit tissues indicate open flowers; (2) mixtures of flowers and stems are made up on the basis of lowest cost. By following the market prices on closed and open flowers and stems, the analyst can usually tell which has been used in preparing a mixture of flowers and stems; (3) the amount of stems present can be roughly estimated from the intensity of the green color of the ether extract; (4) the crude fiber determination, taken in connection with the intensity of the green color of the ether extract and general

appearance and odor of the powder, serves as a good indicator as to the percentages of open or closed flowers and stems. The results of a series of tests show that the insecticidal activity of insect powder is due to a mixture of acids and esters.—*Heber W. Youngken.*

2986. PAMMEL, L. H. Ergotism. *Vet. Med.* 17: 89. 1922.—In this general description of the occurrence of *Claviceps purpurea*, with especial reference to the work done by Dale, Barger, and Carr, the symptoms of ergotism are described, and distinction made between the 2 forms which occur in animals.—*C. D. Marsh.*

2987. PERROT, M. E. La gomme Arabique, le séné et quelques autres produits végétaux du Soudan Anglo-Egyptien. [Gum Arabic, senna, and some other vegetable products of Anglo-Egyptian Soudan.] *Trav. Lab. Matière Med. Faculté Pharm. Paris* 12: 1-72. 16 pl. 1920.—The author briefly describes the vegetation between Cairo and the Kordofan and gives notes upon the principal exportations of raw material of vegetable origin from Anglo-Egyptian Soudan. The gums of commerce are mentioned with their denominations, and the characteristics of the following found in this region: *Acacia Verek* Guill. & Perrott, *A. Seyal* Delile, *A. Seyal fistula* Oliver, *A. arabica* Willd. and var. *tomENTOSA*, *nilotica*, *Kraussiana*, *A. campylocantha* Hochst, *A. sieberiana* DC., *A. nubica* Benth.; *A. verugera* Schw., *A. albida* Delile, *A. horrida* Willd., *A. mellifera* Benth., and *A. tortilis* Hayne. There is also a review of the medicinal *Cassia acutifolia* Delile, *C. obovata* Colladon, and *C. angustifolia* Wahl. The writer concludes with a few notes upon other useful plants of the Soudan.—*H. W. Youngken.*

2988. PETREMANT, R. La "Dbar'at." Étude de l'écorce de racine de Chêne Kermès. ["Dbar'at." Study of the root-bark of Kermes chestnut.] *Bull. Sci. Pharm.* 28: 528. 1921.—Dbar'at is the name given by the natives to the bark of *Quercus coccifera* and the Aleppo pine. It is used by the native physicians for the treatment of diarrhoea and dysentery. The bark contains 15-20 per cent of tannic acid and phlobaphen. The best kinds of bark are collected from trees growing in moist places. It is suggested that the bark be used as a substitute for rhatany. Directions for making fluidextract, extract, tincture, etc., are given.—*H. Engelhardt.*

2989. ROARK, R. C., and G. L. KEENAN. The adulteration of insect powder with powdered daisy flowers. U. S. Dept. Agric. Bull. 795. 12 p., 9 fig. 1919.—Of all the species of *Chrysanthemum*, *C. leucanthemum* probably has been most often utilized for adulterating insect powder and its presence in commercial insect flowers has frequently been detected by the authors. Its uses, insecticidal action, and chemistry are discussed. Analyses of the different commercial grades of insect flowers ("open" and "closed") and insect flower stems with those of the flowers of *C. leucanthemum* show that phosphorous, pentosans, and ash are higher in the flowers of the latter than in those of *C. cinerariaefolium*. After presenting the gross structure and histology of daisy flowers, the authors state that a chemical analysis is insufficient to show adulteration of insect powder with daisy flowers. This adulteration can be definitely determined only by microscopic examination. Powdered daisy flowers are distinguished by the irregular dark-red fragments of the achene and the palisade-like cells comprising the costal tissue of the achene.—*Heber W. Youngken.*

2990. SCHIEMANN, HANNA. Beiträge zur Kenntnis der saponinartigen Stoffe in den Digitalisblättern. [Contribution on the detection of saponin-like bodies in Digitalis leaves.] *Diss. Rostock*, 8 vo., 82 p. 1918.

2991. SHILEIKIS, M. J. Aguona-Papaver Gymine: Aguoniečiai-Papaveraceæ. Želmenija 1: 5. 1 fig. 1921.

2992. WATSON, SAMUEL H., and CHARLES S. KIBLER. Etiology of hay-fever in Arizona and the Southwest. *Jour. Amer. Med. Assoc.* 78: 719-722. 1922.—Hay-fever is caused by the pollens of certain plants which are practically always the wind pollinated species. Sensi-

tization to plant pollen can be determined satisfactorily only by cutaneous tests. Insect pollinated plants are practically not a factor in the hay-fever situation, except in very exceptional instances, for example, when the flowers are deliberately smelled or are grown in great profusion in close contact with the patient, or perhaps in some cases where they are used as room decorations. Roses, daisies, sunflowers, goldenrod, and dandelions, all of which are insect pollinated, will in certain individuals give a positive skin reaction. Although they are capable of exciting hay-fever symptoms on inhalation, they are seldom present in the air in sufficient quantities to do so. Not all wind pollinated plants cause hay-fever. In order that a plant may be an important factor in hay-fever its pollen must be small and buoyant to be carried a considerable distance. The authors classify wind pollinated plants causing hay-fever into 7 groups, including Gramineae, Compositae, Amaranthaceae, Chenopodiaceae, Polygonaceae, Plantaginaceae, and certain trees. In therapeutic work it is necessary to make a census of all wind pollinated plants with data on location, abundance, amount of pollen, and time of pollination, and to perform cutaneous tests with all pollens which are suspected.—In the Southwest the authors find the plants of importance in producing hay-fever include *Amaranthus*, Bermuda grass (*Capriola dactylon*), June grass (*Poa pratensis*), rabbit bush (*Gaertneria deltoidea*), and shad scale (*Atriplex canescens*). Occasionally trees produce a very early type of hay-fever.—*Wm. B. Day.*

2993. WENHOLZ, H. Poisoning of cattle by sorghum and allied plants. [Rev. of: VINALL, H. N. A study of the literature concerning poisoning of cattle by the prussic acid in sorghum, Sudan grass and Johnson grass. Jour. Amer. Soc. Agron. 13: 267-280. 1921.] Agric. Gaz. New South Wales 33: 135-136. 1922.

2994. WILLIAMS, F. N. [Rev. of: FRITCH, F. E., and E. J. SALISBURY. Botany for students of medicine and pharmacy. 357 p., 163 fig. G. Bell: London, 1921.] Jour. Botany 60: 60-62. 1922.

PHYSIOLOGY

B. M. DUGGAR, *Editor*

W. J. ROBBINS, *Assistant Editor*

(See also in this issue Entries 2078, 2094, 2100, 2104, 2118, 2120, 2148, 2200, 2235, 2270, 2273, 2274, 2277, 2279, 2285, 2286, 2288, 2294, 2297, 2298, 2383, 2388, 2420, 2429, 2459, 2517, 2543, 2544, 2547, 2564, 2722, 2756, 2757, 2758, 2791, 2792, 2794, 2805, 2809, 2820, 2920, 2949, 2957, 2958, 2959, 2962, 2969, 2973, 2985, 3133, 3134, 3158, 3163, 3165, 3185, 3186, 3263)

GENERAL

2995. COLE, SIDNEY W. Practical physiological chemistry. 5th ed., xvi + 401 p., 55 fig. C. V. Mosby Co.: St. Louis, 1919.—Unlike many texts in physiological chemistry this book begins with a discussion of the properties of solutions and gives particular attention to the determination of hydrogen-ion concentration; likewise the preparation of standard solutions. New material of interest is included also in the chapter on the preparation and properties of certain amino acids and in that of the properties and hydrolysis of nucleic acid. Oxidase action, autolysis, and a comprehensive discussion of the asymmetric carbon atom are in the main new data.—*B. M. Duggar.*

2996. FISCHER, M. H., G. D. McLAUGHLIN, and MARIAN O. HOOKER. Soaps and proteins; their colloid chemistry in theory and practice. 272 p., 114 fig. J. Wiley and Sons: New York, 1921.—I. The colloid-chemistry of soaps. A comparison is made between the older physico-chemical views of soap and the colloidal conception. The water-holding capacity of different soaps depends upon the nature of the metallic radical combined with the fatty acid. If the radical most effective is given first the sequence is as follows: NH₄, K, Na, Li, Mg, Ca, Hg, Pb, Ba. If the metallic element is kept constant and the acid changed, the absorbing

power of any soap depends upon the nature of the fatty acid, increasing with its position in a given series. Experiments show that a colloidal soap system may be obtained with water only when the concentration of the water is kept sufficiently low: A Na-soap becomes colloidal sooner than a corresponding K-soap.—The tendency to yield colloidal gels diminishes not only quantitatively but also qualitatively in descending the fatty acid series from sodium arachidate to sodium acetate.—A discussion of the general theory of lyophilic colloids is given. The difference between lyophilic and lyophobic colloids does not depend upon their liquid or liquid plus solid characters, but upon the fact that the phases are either mutually soluble or insoluble.—Definitions of hysteresis, swelling, liquefaction, gelation capacity, solvation capacity, synerism, and sol are given. The reaction of soaps to indicators is discussed.—The physical state of soap mixtures is determined by the soap of the lower gelation capacity.—There is an historical discussion of "salting out." As the acetic acid series is ascended a lower and lower concentration of NaCl is required to bring about salting out.—The foaming, emulsifying, and washing properties of soaps are dependent upon their ability to yield liquid and hydrated colloids. K-soaps do not begin foaming as early as the corresponding Na-soaps.—*II. Colloid-chemistry of soap manufacture.* The ease with which emulsification is obtained is determined by the physical qualities of the soap itself; the fat is not emulsified in water but in a liquid hydrated colloid. The upper limit for the concentration of any hydroxide that may be used for the saponification of a fat is determined by the concentration at which the soap of the highest fatty acid found in the fat is salted out.—When the temperature of a boiling soap-water system is lowered it changes to water-soap.—The ordinary bar of pure soap is a solid "solution" of water in a mixture of sodium soaps. This stock sodium soap contains a long list of fatty acids.—A cold water soap is one which will in cold water yield the hydrated colloid necessary for washing. A hot water soap must contain higher fatty acids, otherwise it would pass through the liquid hydrophilic colloid state into true solution.—Fillers for soaps, such as potato flour, clay, asbestos, etc., are largely colloid and possessed of a considerable capacity for hydration; they only increase the volume and not the value of the soap.—*III. The analogies in the colloid-chemistry of soaps, protein derivatives and tissues.* The laws that govern "solution" and hydration of soaps are identical with those which govern the solution and hydration of proteins, and these are the laws of absorption of water by cells, tissues, and the whole living organism. Fatty acids are analogous in behavior to the amino acids; fatty acids may combine with bases to form soaps; polymerized amino-fatty acids may combine with bases to form soap-like compounds. Various experiments are carried out showing the analogies between fatty and amino acids and proteins. It is shown that fatty acids may be sulphonated, saturated with H, oxidized, or iodized; proteins may be oxidized, hydroxylated, or have acids bound to them at other than the NH_2 groupings.—The foundations of living matter are polymerized amino (fatty) acids to which are joined various bases like K, Na, Mg, and Ca, and also various acid radicals, chlorides, bromides, sulphates, etc., the whole constituting a unit capable of dissolving a certain amount of water. Even the blood and lymph have this colloidal chemical constitution; however, the secretions are "solutions" of protoplasmic material in water.—The essence of physiological reactions must be found in colloid-chemical changes in the protein fraction of the protoplasmic mass. It is argued that to aid nature in her effort to restore an injured cell the scientist must learn the correct applications of colloid-chemistry.—*IV. Appendix.* This consists of tables giving physico-chemical constants of various fatty acids, also of various alcohols.—*Grace E. Howard.*

2997. GRAVIS, A. *Éléments de physiologie végétale.* [Elements of plant physiology.] 144 p., 702 fig. Vaillant-Carmame: Liège (Vigot: Paris), 1921.—This book includes 4 parts, devoted respectively to nutrition, relation to external conditions, reproduction, and synthesis. It is intended for students. In regard to nutrition, the author deals successively with those plants containing chlorophyll, those which contain no chlorophyll, and likewise those which are parasitic, mutualistic, and carnivorous. In the 2nd part, the action of external agents upon young and mature organs and their influence upon structure are studied. In the 3rd part he treats of heredity, variability, varieties and races, and then of the theory of evolution. The part dealing with synthesis is related to that on nutrition but further draws a comparison

between animal and plant physiology and closes with a discussion of the cycle of organic products and their evolution.—*Henri Micheels.*

2998. HAAS, PAUL, and T. G. HILL. *An introduction to the chemistry of plant products. 3rd ed. Vol. I. On the nature and significance of the commoner organic compounds of plants. 414 p.* Longmans, Green & Co.: London & New York, 1921.—The 1st volume of the new edition of this work includes practically the same materials as the earlier edition; that is, laying emphasis upon the chemical aspect. Some of the plant physiology has been omitted with the idea of elaborating this in volume 2. The additions to the 2nd edition consist chiefly in bringing the material up-to-date and in a more complete presentation of "plant pigments" and a practically new discussion of the "colloidal state."—*B. M. Duggar.*

2999. HAWK, P. B. *Practical physiological chemistry. 7th ed., xiv + 675 p., 2 pl., 192 fig.* P. Blakiston Sons and Co.: Philadelphia, 1921.—In the new edition it is endeavored to bring this work up-to-date and it is particularly noteworthy that the importance of vitamins has necessitated considerable space in the general discussion of metabolism. Aside from this the main revision has been of greater interest to the student of medicine, though new methods of analytical work are noticeable throughout. The section on hydrogen-ion concentration has not been extended to meet the advances in this field.—*B. M. Duggar.*

3000. LÖHNIS, F. *Landwirtschaftlich-bakteriologisches Praktikum. Anleitung zur Ausführung von landwirtschaftlich-bakteriologischen Untersuchungen und Demonstrations-Experimenten.* [Practical agricultural bacteriology. Methods for the prosecution of agricultural-bacteriological investigations and demonstration experiments.] *2nd ed., 160 p., 3 pl., 40 fig.* Gebrüder Borntraeger: Berlin, 1920.

3001. PETERSEN, W. F. *Protein therapy and nonspecific resistance. 314 p.* MacMillan Co.: New York, 1922. [With an introduction by J. L. MILLER.]—This book is cited as of interest to physiologists because in addition to the specific pathological discussion, there is much of fundamental nature bearing upon such problems as immunity, protein decomposition, enzyme action, and other processes of interest in the general biology of the living organism.—*B. M. Duggar.*

3002. PIÉRON, HENRI. *Du rôle et de la signification du conflit scientifique entre mécanisme et vitalisme.* [The rôle and significance of the scientific conflict between mechanism and vitalism.] *Scientia* 31: 115-126. 1922.

• PROTOPLASM, MOTILITY

3003. CHAMBERS, ROBERT. *The effect of experimentally induced changes in consistency on protoplasmic movement.* *Proc. Soc. Exp. Biol. and Med.* 19: 87-88. 1921.—Amoebae mechanically agitated tend to change from a more solid to a less solid phase. If experimentally agitated they die. Traces of acid throw the normal state to the more solid phase, while alkali throws it to the more liquid side. These observations harmonize with the author's experiments on acid and base organic dyes.—*M. M. Brooks.*

DIFFUSION, PERMEABILITY, PHYSICO-CHEMICAL RELATIONS

3004. ABRAMSON, HAROLD A., and SAMUEL H. GRAY. *The diffusion of sodium chloride through a "lecithin"-collodion membrane.* *Proc. Soc. Exp. Biol. and Med.* 19: 114-117. 1921.—Bags were prepared (a) from collodion and (b) from collodion which contained "lecithin." The drying time was varied. They were filled with $\frac{M}{4}$ NaCl and immersed in 350 cc. water for 20 minutes, after which the outside fluid was titrated for chlorides. The author concludes that collodion membranes without lecithin, having a drying time up to 4 minutes, do not alter their permeability to NaCl; those with 50 per cent lecithin by weight become relatively semipermeable with decreasing drying times.—*M. M. Brooks.*

3005. BROOKS, MATILDA M. **The penetration of cations into living cells.** Jour. Gen. Physiol. 4: 347-349. 1922.—Direct tests of the cell sap of *Nitella* showed that the protoplasm is normally permeable to Li, Cs, and Sr, and that the penetration is more rapid in an unbalanced than in a balanced solution. The spectroscopic method was used in detecting the presence or absence of the cations.—O. L. Inman.

3006. GREAVES, J. E., and YEPPA LUND. **The role of osmotic pressure in the toxicity of soluble salts.** Soil Sci. 12: 163-181. 12 fig. 1921.—The osmotic pressure was determined by cryoscopic and electrical conductivity methods in soil to which the chlorides, sulphates, carbonates, and nitrates of potassium, sodium, cadmium, magnesium, iron, and manganese had been added in quantities such that (a) the salts became toxic to the ammonifying organism, (b) the quantity of ammonia produced per unit time was reduced to $\frac{2}{3}$ normal, (c) the concentration of the salt in the soil was 10×10^{-3} M per 100 gm. of soil, (d) the salt became toxic to the nitrifying organisms, (e) the nitric nitrogen produced per unit time was $\frac{2}{3}$ normal, (f) there would be 2×10^{-3} M of the salt per 100 gm. of soil. With the exception of manganese nitrate, iron nitrate, and sodium carbonate there is a close correlation between toxicity and osmotic pressure. All the salts tested except the 3 mentioned became toxic when the osmotic pressure was less than 3 atmospheres. As the concentration of the salt increases, the retarding effect upon the ammonifying organism is not due entirely to the osmotic pressure. All salts tested reduced ammonification to less than $\frac{1}{2}$ normal when the osmotic pressure of the soil reached 15 atmospheres. With the exception of sodium chloride, manganese nitrate, and iron chloride, all the salts tested became toxic to nitrifying organisms when the osmotic pressure ranged between 1 and 2 atmospheres. All the salts reduced nitrification to less than 50 per cent when the osmotic pressure reached 6 atmospheres.—W. J. Robbins.

3007. GREEN, ROBERT G. **Rapid determination of surface tension.** Proc. Soc. Exp. Biol. and Med. 19: 62. 1921.—An apparatus in which the drop-weight method is used for determining surface tension of liquids is described.—M. M. Brooks.

3008. LARSON, W. P. **The effect of the surface tension of the culture medium on the growth of bacteria.** [Abstract.] Absts. Bact. 5: 2-3. 1921.

3009. LARSON, W. P. **The influence of the surface tension of the culture medium on bacterial growth.** Proc. Soc. Exp. Biol. and Med. 19: 62-63. 1921.—Pellicle-forming bacteria which grow on the surface of liquid media will grow throughout the body of the medium by depressing the surface tension. The addition of soaps wets the organisms, creating better nutritive conditions. Examples are given.—M. M. Brooks.

3010. McLEAN, F. T. **The permeability of citrus leaves to water.** Philippine Jour. Sci. 19: 115-125. Fig. 1. 1921.—A method is described for determining the pressure required to force water through the stomata of leaves. This pressure seems to be lowest when leaves are exposed to bright diffused light and well supplied with moisture. There is some correlation between the required pressure and the average width of stomatal openings in different varieties.—E. D. Merrill.

3011. NEILL, ALMA J. **A comparison of the rate of diffusion of certain substances, particularly the food materials, enzymes and pro-enzymes.** Amer. Jour. Physiol. 57: 478-495. 1921.—Various food substances and enzymes were placed in collodion sacs and dialyzed, usually for 30 minutes. The simpler food materials were usually dialyzed against distilled water and the enzymes against Ringer's solution or HCl. Bile increased the diffusibility of fats and fatty acids. The carbohydrates diffuse in the ascending scale polysaccharides, disaccharides, monosaccharides. "As a rule, the more powerful saline cathartics diffuse less rapidly than the less powerful" with exceptions which suggest that the action of cathartics involves more than their osmotic and diffusion qualities. Glycocoll diffuses more rapidly than alanine, and acetic acid more rapidly than propionic. Ptyalin and catalase and pepsinogen do not

diffuse while pepsin, trypsin, and trypsinogen do. Urea was the most diffusible of all substances tested. Glycerol diffuses more rapidly than either oleic or palmitic acids or the sodium soaps of these acids.—*Ernest Shaw Reynolds.*

3012. OSTERHOUT, W. J. V. Direct and indirect determinations of permeability. Jour. Gen. Physiol. 4: 275-283. Fig. 1. 1922.—Methods are described for obtaining cell sap of *Nitella* without contamination. Tests of the cell sap show that in a balanced solution of NaNO_3 plus $\text{Ca}(\text{NO}_3)_2$ there is a slow penetration of NO_3 and that the cell remains in normal condition; but in pure NaNO_3 there is rapid penetration accompanied by injury. A method is described for the determination of the electrical conductivity of the cells of *Nitella*. By the use of this method similar results on the penetration of NO_3 were obtained.—*O. L. Inman.*

WATER RELATIONS

3013. AITKEN, R. D. The water relations of the pine (*Pinus pinaster*) and the silver tree (*Leucadendron argenteum*). Trans. Roy. Soc. South Africa 10: 5-19. 1921.—Farmer's experiments on the water-conducting power of the wood of trees have been extended to certain trees growing in the Cape Peninsula. *Pinus pinaster* has wood of low water-conducting power, its specific conductivity being a little higher than that recorded by Farmer for *P. sylvestris*. *Leucadendron argenteum* has wood of high water-conducting power for an evergreen tree, its specific conductivity being rather more than double that of the pine.—A method of estimating the surface area of pine leaves is described.—Pine twigs, kept with the cut ends in water, show a far higher rate of transpiration, both per twig and per unit leaf area, than do similar twigs of the silver tree.—The ratio of transpiration to transmission is far higher in the pine than in the silver tree. This is shown to indicate that under the experimental conditions pine needles exert a greater suction on the water in the stem than do silver tree leaves.—When transpiration is followed in twigs, as they dry, it is found that the pine twigs at first transpire more rapidly than the silver tree twigs. After a short time, however, the transpiration of pine twigs suddenly drops and becomes less than that of the silver tree twigs.—Determinations of water content show that the silver tree leaves have a greater water content expressed as a percentage of fresh weight than have pine needles.—The bearing of these results on the water relations of whole trees is discussed, and possible interpretations suggested. It is concluded, however, that all that can definitely be said at present is that the pine leaves appear to be more resistant to unfavorable conditions than the silver tree leaves.—*E. M. Doidge.*

3014. PETERS, RUPERT. Moisture requirements of germinating seeds. Univ. Kansas Sci. Bull. 13: 23-37 Fig. 1-2. 1920.—Seed were planted in quartz sand having a wilting coefficient of 1.31 per cent. The germinating seed lowered the moisture content to an average of 0.584 per cent for *Zea Mays*, 0.42 per cent for *Phaseolus vulgaris*, and 0.83 per cent for *Triticum vulgare*. Comparison is made with plants growing in soil, which, regardless of species, at the time of permanent wilting leave a uniform water content in the soil.—*W. C. Stevens.*

MINERAL NUTRIENTS

3015. BERTRAND, GABRIEL, et MME. M. ROSENBLATT. Sur la répartition du manganèse dans l'organisme des plantes supérieures. [On the distribution of manganese in the tissues of the higher plants.] Compt. Rend. Acad. Sci. Paris 173: 1118-1120. 1921.—Determinations are given of the various parts of tobacco and a Japanese lily. Manganese is found to be present in larger amounts in the leaves, flowers, and fruits than in the stem and roots. Readings are given in mgm. per 100 gm. of fresh material, of dry weight, and of ash respectively. A maximum is reached in the seed of tobacco, which contain 127.7 mgm. per 100 gm. of ash; and a minimum is found in the wood of the upper $\frac{1}{3}$ of the stem where there are only 0.05 mgm. It is suggested that the larger amount in the seed is a provision for supplying the new plant with sufficient manganese in case an adequate supply is lacking in the soil.—*C. H. Farr.*

3016. EVANS, A. C. A buffered physiologic salt solution. Jour. Infect. Diseases 30: 95-98. 1922.—In view of the fact that the H-ion concentration of the solution influences the

agglutination reactions of bacteria, it is suggested to use a buffer mixture of the proper concentration of phosphates. One part of this phosphate mixture of the proper H-ion concentration may be added to 9 parts of a 0.9 per cent NaCl solution.—*Selman A. Waksman.*

3017. FREUNDLER, P., et MILES, Y. MENAGER et Y. LAURENT. *La composition des Laminaires.* [The composition of the Laminarias.] *Compt. Rend. Acad. Sci. Paris* 173: 1116-1118. 1921.—It is found that the kelp of this group return much iodine to the sea by loss and destruction of parts or of entire plants, and also by normal processes. In the spring the concentration in the tissues is about 0.7 per cent, in the summer about 1 per cent, and in November about 0.55 per cent. It is found that there is a correspondence between the amount of iodine present and the intensity of the brown pigment. Lapique had previously reported a higher carbohydrate content during the summer. It is therefore concluded that maximum insolation results in a maximum concentration of iodine, carbohydrates, and brown pigment. Iodine is therefore considered essential to the photosynthesis of these plants.—*C. H. Farr.*

3018. HANNEVART, GERMAINE. *Sur la présence de thiosulfate de calcium dans Achromatum oxaliferum* Schew. [The presence of calcium thiosulphate in *Achromatum oxaliferum.*] *Acad. Roy. Belgique Bull. Cl. Sci.* 12: 600-605. 7 fig. 1920.—This is one of the gigantic bacteria measuring about $30 \times 20\mu$, occurring upon the bottom mud. The chromidium presents the aspect of a net and possesses granulations certainly made up of sulphur. Between the meshes of the net there are large inclusions which are not the oxalate nor the carbonate of calcium, but are the thiosulphate. There is an accumulation of reserves of sulphur in summer (the decomposition of organic materials and the setting free of H_2SO_4 are more considerable). During the winter the sulphur is utilized with intermediate transformation into hyposulphite.—*Henri Micheels.*

3019. HARLAN, HARRY V., and MERRITT N. POPE. *Ash content of the awn, rachis, palea, and kernel of barley during growth and maturation.* *Jour. Agric. Res.* 22: 433-449. 5 fig. 1921.—In some varieties of barley [*Hordeum*] as much as 30 per cent of the dry weight of awns is ash. Within a variety the amount of ash in the awns is correlated with the supply of soil water.—There are varietal differences in the amount of ash deposited in the rachis. The rachises of hooded and awnless varieties are usually high in ash and usually brittle. In the "Coast" types the ash content is low. Their use in hybridization is suggested.—The ash content of paleae is comparable with that of the awn so far as the nature of the daily deposits is concerned, but the total percentage at maturity is much less.—No part of the kernel proper is used as a repository for ash.—*D. Reddick.*

3020. SAUVAGEAU, C., et G. DENIGÈS. *Sur les efflorescences des algues marines du genre Cystoseira.* [On the efflorescences of the marine algae of the genus *Cystoseira.*] *Compt. Rend. Acad. Sci. Paris* 173: 1049-1053. 1921.—A study is made of the incrustations and deposits on the surfaces of various species of this genus. They are found not to be due to potassium iodide as Mme. Segers-Laureys found in *Laminaria*, nor to trehalose as Kylin found in various members of the red algae. Microchemical tests made reveal the presence of potassium chloride to the extent of 10 to 15 per cent, and a trace of mannite. Forms not showing the efflorescence have large or small amounts of mannite, but are uniformly low in potassium chloride, the latter substance varying in amount in these forms from 1.49 to 5.66 per cent. The deposit is therefore to be attributed to the potassium chloride. Both the efflorescence and the potassium chloride content vary with the season of the year.—*C. H. Farr.*

3021. SKINNER, J. J., and F. R. REID. *Nutrient requirements of clover and wheat in solution culture.* *Soil Sci.* 12: 287-299. Pl. 1., 3 fig. 1921.—Using the triangle system, red clover, *Trifolium pratense*, was grown for 35 days in mixtures of sodium nitrate, potassium sulphate, and calcium acid phosphate, varying by differences of 10 per cent. At about 5-day intervals the nutrient solution was changed and analyzed colorimetrically. The results

are compared with a similar experiment previously performed with wheat. The results show that clover makes its best growth in solutions high in potassium and nitrogen and absorbs a greater per cent of potassium from the solution than does wheat.—*W. J. Robbins.*

3022. WINSLOW, C.-E. A., and DOROTHY F. HOLLAND. The effect of potassium and magnesium salts upon bacterial viability. [Abstract.] *Absts. Bact.* 6: 10. 1922.

3023. WINSLOW, C.-E. A., and MARGARET HOTCHKISS. The effect of mineral salts on the growth of bacteria. [Abstract.] *Absts. Bact.* 6: 4. 1922.

PHOTOSYNTHESIS

3024. EWART, ALFRED J. On the synthesis of sugar from formaldehyde and its polymers, its quantitative relations and its exothermic character. *Proc. Roy. Soc. Victoria* 32: 168-188. 1920.—The research was undertaken to elucidate possible modes in which plants could synthesize sugar from formaldehyde. The conclusion is reached that the production of formaldehyde does not form a stage in the synthesis of sugar in plants and that it would be a very wasteful indirect way of producing sugar. The reasons cited are: (1) The photo-chemical oxidation of chlorophyll in the presence of light and absence of carbon dioxide yields formaldehyde as a decomposition product. This is not increased by the presence of carbon dioxide. (2) Alkalies do not polymerize formaldehyde to sugar, or do so only to a very slight extent; instead they produce methyl alcohol and formates. Pronounced sugar formation takes place only when the alkali acts on a polymer such as paraformaldehyde, the polyhydrate, or metaformaldehyde. The production of sugar from a solution of formaldehyde mainly depends on the presence of the polyhydrate; it is almost negligible in cold dilute solution. For complete reaction and high polymerization a temperature of 90-100°C. is necessary; even then the polymerization is only partial. (3) Every method of polymerizing formaldehyde to sugar yields a mixture of sugars, including pentoses, often a considerable amount, and not hexoses, starch, and polysaccharides. Pentoses are not direct products of photosynthesis in plants. (4) It is as easy for the plant to produce sugar directly as to produce formaldehyde. (5) Biose sugar (glycollic aldehyde) is readily polymerized by sodium carbonate to acriose, a hexose sugar. (6) The reactions discussed for producing sugar would be endothermic, as in the plant. Production of sugar from polymers of formaldehyde involves an exothermic reaction which may be very violent. (7) Magnesium hydrate has a slower polymerizing action on formaldehyde than any other metallic alkali. If it acts as a polymerizer it must be in ferment fashion hence differing widely from the action of other alkalis. (8) If photosynthesis involves actual combination of chlorophyll and carbon dioxide, which combination is disintegrated by light into chlorophyll and carbohydrate, hexoses would be formed as readily directly as through the intervention of biose, and the chlorophyll would act as a lytase or carboxidase enzyme. Its mode of action in producing glycollic aldehyde would also be that of an enzyme.—The amount of sugar polymerization was found to vary with the bases used, being greater for divalent than for monovalent alkali metals.—*Eloise Gerry.*

3025. ROUGE, E. Recherches sur l'assimilation. [Investigations upon assimilation.] *Bull. Soc. Bot. Genève* 12: 138-140. 1920.—The author was unable to obtain formol as 1 of the products of photosynthesis in leaves. Glycollic aldehyde was present. Additional experiments will be made to determine whether the present conclusions may be confirmed.—*W. H. Emig.*

METABOLISM (GENERAL)

2026. AVERY, O. T., and HUGH J. MORGAN. The effect of accessory substances of plant tissue upon growth of bacteria. *Proc. Soc. Exp. Biol. and Med.* 19: 113-114. 1921.—When sterile unheated vegetables (white turnip, carrot, etc.) are added to broth they produce an abundant growth of the hemoglobinophilic bacilli such as *B. influenzae*. Under these conditions the range of H-ion concentration for growth of these organisms is extended. Certain "obligate anaerobes" grow in this medium without exclusion of air.—*M. M. Brooks.*

3027. AYRES, S. HENRY, and COURTLAND S. MUDGE. **Vitamines in relation to the growth of the Streptococcus.** [Abstract.] *Absts. Bact.* 6: 3-4. 1922.—“As far as our experiments are concerned it must be concluded that the stimulating property of fats and oils either is not due to fat-soluble A, or this vitamine must be in mineral oils, or else the stimulation is due to different cause in the case of vitamine-containing and mineral oils.”—*From Authors' Abstract.*

3028. BRAECKE, MARIE. **Étude microchimique du bulbe d'ail.** [Microchemical study of the garlic bulb.] *Mem. in 8° Acad. Roy. Belgique, Cl. Sci.* II, 6. 36 p., 3 pl. 1921.—The garlic bulb contains: (1) a sulphur-containing glucoside in the cells of the parenchyma which is decomposed by hydrolysis into garlic oil and fructose; (2) a ferment capable of decomposing this glucoside and localized in the protein-containing cells of the sheath, which is free from woody elements; (3) a polysaccharide, inulin, which is transformed into fructose; and (4) starch, in the sheath surrounding the vascular system and in the roots.—*Henri Micheels.*

3029. BROADHURST, JEAN. **The effect of vitamine extracts in revivifying old cultures.** [Abstract.] *Absts. Bact.* 5: 3. 1921.—“Water soluble B” is a revivifier of many species.—*D. Reddick.*

3030. COWGILL, GEORGE R. **A contribution to the study of the relation between vitamin-B and the nutrition of the dog.** *Amer. Jour. Physiol.* 57: 420-436. 4 fig. 1921.—Alcoholic extracts of wheat embryos, rice polishings, and navy beans contain an appetite-promoting factor which is curative of polyneuritic dogs and pigeons. Neutralized tomato juice acts similarly. This effect therefore seems to be due to vitamin-B.—*Ernest Shaw Reynolds.*

3031. COWGILL, GEORGE R., and LAFAYETTE B. MENDEL. **Studies in the physiology of vitamins. I. Vitamin-B and the secretory functions of glands.** *Amer. Jour. Physiol.* 58: 131-151. 1921.—“There is no direct relation between vitamin-B and the secretory function of the pancreas, liver and salivary glands.”—*Ernest Shaw Reynolds.*

3032. DOWNS, CORNELIA M. **Studies on the hydrogen-ion concentration and the metabolism of B. typhosus.** [Abstract.] *Absts. Bact.* 5: 5-6. 1921.

3033. DUTCHER, R. ADAMS, and STANLEY DEAN WILKINS. **Vitamin studies. VII. The influence of testes in single comb white leghorn cockerels.** *Amer. Jour. Physiol.* 57: 437-443. 1921.—Atrophy of testes occurs on a diet of polished rice but neutralized when a small amount of fresh alfalfa is fed. Atrophy may occur in cockerels which gain in body weight showing the greater dependence of development of reproductive organs on vitamins.—*Ernest Shaw Reynolds.*

3034. FINKS, A. J., and CARL O. JOHNS. **Studies in nutrition. IX. The nutritive value of the proteins from the Chinese and Georgia velvet beans.** *Amer. Jour. Physiol.* 57: 61-76. 1921.—The proteins obtained from the Chinese and Georgia velvet beans by coagulation “are adequate for the normal growth of albino rats.” “Chinese velvet bean protein prepared by dialysis” was unsatisfactory for growth, as was the meal cooked or autoclaved even when supplemented with cystine or casein. A toxic effect appeared in the steam-cooked meal.—*Ernest Shaw Reynolds.*

3035. FRAZIER, WILLIAM C. **Some of the chemical and bacteriological changes in inoculated corn silage.** [Abstract.] *Absts. Bact.* 5: 8. 1921.

3036. HAAR, A. W. VAN DER. **Anleitung zum Nachweis, zur Trennung und Bestimmung der reinen und aus Glukosiden usw. erhaltenen Monosaccharide und Aldehydsäuren (l-Arabinose, d-Xylose, l-Rhamnose, Fukose, d-Glukose, d-Mannose, d-Galaktose, d-Fruktose, d-Glukuronsäure, d-Galakturonsäure und Aldehydschleimsäure) nach experimentellen Untersuchungen.** [Methods for the demonstration, separation, and determination of pure

monosaccharids and aldehyde acids and those derived from glucosides on the basis of experimental investigations.] ix + 345 p., 10 pl., 14 fig. Gebrüder Borntraeger: Berlin, 1920.

3037. HAMMER, B. W. The type of lactic acid produced by starters and by organisms isolated from them. Iowa Agric. Exp. Sta. Res. Bull. 65. 115-128. 1920.

3038. HEUSER, EMIL. Lehrbuch der Cellulosechemie. Für Studierende an technischen Hochschulen und Universitäten sowie für Cellulose-Fachleute. [Textbook of cellulose chemistry. For students in technical colleges and universities, also for those in cellulose industries.] 183 p., 3 fig. Gebrüder Borntraeger: Berlin, 1921.

3039. LAMB, ALVIN R., and JOHN M. EVVARD. Vitamines on the farm: Their practical relation to life-stock feeding. Iowa Agric. Exp. Sta. Circ. 73. 1922.

3040. RIDEAL, SAMUEL, and Associates. The carbohydrates and alcohols. 219 p., 11 fig. Van Nostrand Co.: New York, 1920.—This volume is one of a series of handbooks dealing with matters of applied chemistry, treated from the chemical rather than the engineering point of view. A general survey of the industries dealing with the manufacture of conversion of starch, sugar, and alcohol is given. The book includes historical notes, a discussion of present tendencies and future development, a comparison of industrial methods and their progress in the chief producing countries, and a bibliography which aims to be a guide to the standard literature of the subject.—*Joanne L. Karrer.*

3041. ROUSSEAU, EUG., et SIROT. Les matières azotées et l'acide phosphorique dans la maturation et la germination du blé. [The nitrogenous materials and phosphoric acid in the ripening and germination of wheat.] Ann. Sci. Agron. Française et Etrangère 37: 250-258. 1920.—On samples of wheat taken every 5 days from the time of grain formation until harvest, determinations of total and water-soluble nitrogen, total and water-soluble phosphoric acid, and acidity were made. Methods of analysis and results are submitted. The data show that from the time of the 1st sampling, June 6, until July 5 the ratio of soluble nitrogen to total nitrogen dropped off rather sharply and steadily (from 49 to 9.2 per cent); from July 12 to 16 there was an increase, and thereafter and until harvest the ratio remained almost constant. The curve for the ratio of soluble to total phosphoric acid parallels approximately that of nitrogen, but the ratio of soluble to total phosphoric acid was always 20-30 per cent higher than for nitrogen. Acidity steadily and clearly decreased throughout grain formation.—The practical importance of the parallelism between the ratios of soluble and total phosphoric acid and nitrogen in relation to gluten formation is pointed out. In manuring, attention must be given to the use of phosphatic as well as nitrogenous fertilizers.—Attention is drawn to the value of nitrogen determinations in ascertaining the baking value of wheat flour and the true condition of malted products.—*A. B. Beaumont.*

3042. SANTOS, FRANCISCO O. Some plant sources of vitamins B and C. Proc. Soc. Exp. Biol. and Med. 19: 2-3. 1921.—The author mentions the vitamin B and C content of togi, okra, avocado, mango, sweet potato leaves, dunat, artichokes, bilimbi, banana flower bud, and bamboo shoots.—*M. M. Brooks.*

3043. SMITH, CLARENCE A., OLAF BERGEIM, and PHILIP B. HAWK. The antiscorbutic potency of strawberries. Proc. Soc. Exp. Biol. and Med. 19: 22. 1921.—Fresh or boiled strawberries have the power of overcoming scurvy in guinea pigs.—*M. M. Brooks.*

3044. STEENBOCK, H., E. M. NELSON, and E. B. HART. Fat soluble vitamine. IX. The incidence of an ophthalmic reaction in dogs fed a fat soluble vitamine deficient diet. Amer. Jour. Physiol. 58: 14-19. Fig. 1-3. 1921.—Cod liver oil or an ether extract of saponified cod liver oil prevented or cured ophthalmia in dogs which had been kept upon a diet poor in fat-soluble vitamin.—*Ernest Shaw Reynolds.*

METABOLISM (NITROGEN RELATIONS)

3045. ANONYMOUS. [Rev. of: KNOX, JOSEPH. *The fixation of atmospheric nitrogen*. 2nd ed., vii + 124 p. Guerny and Jackson: London, 1921.] *Nature* 109: 73. 1922.—The addition of data accumulated since 1913 is not so extensive as might be expected.—O. A. Stevens.

3046. BOSWORTH, A. W., M. G. ELKINS, and M. E. BLANCHARD. A study of ammonia production by a certain strain of avirulent human tubercle bacillus. *Jour. Infect. Diseases* 30: 357-362. 1922.—As a result of a study of the nitrogenous metabolism of an avirulent culture of human tubercle bacilli, it was found that over 30 per cent of the nitrogen originally present in the medium can be converted into ammonia; the ammonia is partly retained in the medium, while a greater part is lost through volatilization. The loss of ammonia is coincident with an alkaline reaction of the medium. The amount of ammonia utilized by the organism is small in comparison with that lost by volatilization.—Selman A. Waksman.

3047. CAJORI, F. A. A globulin as the principal protein of the pecan nut: its chemical and nutritive properties. *Proc. Soc. Exp. Biol. and Med.* 19: 52. 1921.—Large amounts of basic amino-acids were found in this globulin. Young rats fed on this substance maintained adequate growth.—M. M. Brooks.

3048. HALL, IVAN C., and FLORENCE FINNERUD. The production of tyrosine by a putrefactive anaerobe. *Proc. Soc. Exp. Biol. and Med.* 19: 48-50. 1921.—A method is described for extracting crystals of tyrosine from a pure culture of an unknown putrefactive anaerobe.—M. M. Brooks.

3049. ITANO, ARAO. Influence of vitamine B (?) and nucleic acid on *Azotobacter*. [Abstract.] *Absts. Bact.* 6: 16. 1922.—The substances stimulated growth and the fixation of nitrogen at certain concentrations under 1:10,000.—D. Reddick.

3050. KENDALL, A. L. The significance and quantitative measurement of the nitrogenous metabolism of bacteria. *Studies in bacterial metabolism*. LVII. *Jour. Infect. Diseases* 30: 211-224. 1922.—The nitrogen metabolism of bacteria can be determined in the cultures, in the majority of instances, by measuring (1) total nitrogen, (2) protein nitrogen, (3) non-protein nitrogen, (4) "polypeptid" nitrogen, (5) amino nitrogen, and (6) free ammonia. In addition, determinations are made of the titratable acidity and hydrogen-ion concentration of the cultures.—Selman A. Waksman.

3051. KENDALL, A. I., and R. S. BLY. The nitrogenous metabolism of *Bacillus coli*. *Studies in bacterial metabolism*. LXII. *Jour. Infect. Diseases* 30: 239-244. 1922.—A study is reported of nitrogenous metabolism of *B. coli*, in the presence and absence of glucose, as outlined by Kendall [see Bot. Absts. 11, Entry 3050].—Selman A. Waksman.

3052. KENDALL, A. I., and A. A. DAY. The nitrogenous metabolism of *Bacillus alkalescens*. *Studies in bacterial metabolism*. LXIV. *Jour. Infect. Diseases* 30: 248-250. 1922.—See Bot. Absts. 11, Entry 3050.

3053. KENDALL, A. I., and R. C. HANER. The nitrogenous metabolism of *B. dysenteriae* (Shiga), *Bacillus typhosus*, *B. paratyphosus alpha* and *B. paratyphosus beta*. *Studies in bacterial metabolism*. LVIII-LXI. *Jour. Infect. Diseases* 30: 225-238. 1922.—This is a study of the nitrogen metabolism of a few bacteria, as outlined by Kendall [see Bot. Absts. 11, Entry 3050].—Selman A. Waksman.

3054. KENDALL, A. I., H. C. CHEETHAM, and C. S. HAMILTON. The nitrogenous metabolism of *Bacillus proteus*. *Studies in bacterial metabolism*. LXV. *Jour. Infect. Diseases* 30: 251-258. 1922.—A study is reported on nitrogenous metabolism of *B. proteus*, as outlined

by Kendall [see Bot Absts. 11, Entry 3050]. The organism forms a soluble proteolytic enzyme in plain gelatin which may be obtained in an active state free from bacteria.—“The enzyme appears to be a preparatory enzyme in the sense that it prepares protein for assimilation by the bacteria; it has no demonstrable rôle in the intracellular utilization of protein by the bacteria.”—“The liquefaction of gelatin by the bacteria-free enzyme is not accompanied by the liberation of ammonia; deamination is an independent phenomenon associated with the intracellular utilization of the products of proteolysis by the organisms themselves.”—*Selman A. Waksman*.

3055. KENDALL, A. I., R. C. HANER, and R. S. BLY. The nitrogenous metabolism of the Schmitz bacillus. Studies in bacterial metabolism. LXIII. Jour. Infect. Diseases 30: 245-247. 1921.—See Bot. Absts. 11, Entry 3050.

3056. MERRILL, ALICE R. THOMPSON. Experimental studies on cystine. Jour. Amer. Chem. Soc. 43: 2688-2696. 1921.

3057. MILLER, HARRY G. Nitrogen compounds in alfalfa hay. Jour. Amer. Chem. Soc. 43: 2656-2664. 1921.

3058. RETTGER, LEO F. The influence of carbohydrate on the nitrogen metabolism of bacteria. [Abstract.] Absts. Bact. 5: 3-4. 1921.—Further evidence is presented in support of the statement that “the retarding or preventive influence of a utilizable carbohydrate on nitrogen metabolism may be materially modified when appreciable amounts of a buffer like di-potassium phosphate are employed in the medium.”—*D. Reddick*.

3059. SHAW, R. H., P. A. WRIGHT, and E. F. DEYSHER. Nitrogen and other losses during the ensiling of corn. U. S. Dept. Agric. Bull. 953. 16 p. 1921.—Analyses of silage before and after storage showed (1) about 10 per cent loss of dry matter, due to the fermentation of carbohydrates and the washing down of these and of nitrogenous compounds, and (2) a gain in ether extract.—*Mildred L. Johnson*.

3060. SHIPLE, GEORGE J., and CARL P. SHERWIN. Synthesis of amino acids in animal organisms. Synthesis of glycocoll and glutamine in the human organism. Jour. Amer. Chem. Soc. 44: 618-624. 1922.

METABOLISM (ENZYMES, FERMENTATION)

3061. ANDERSON, J. A., W. H. PETERSON, and E. B. FRED. Fermentation products from hexoses and related compounds by certain pentose fermenting bacteria. [Abstract.] Absts. Bact. 6: 5. 1922.

3062. BECCARD, ERICH. Beiträge zur Kenntnis der Sauerteiggärung. [Contributions to our knowledge of leaven fermentation.] Centralbl. Bakt. II Abt. 54: 465-471. 1921.—On a medium consisting of bran extract sterilized by filtration, 2 strains of acid-forming bacteria were isolated. These organisms were capable of producing volatile and non-volatile acids and alcohol. In baking tests in which they were employed a bread was produced corresponding in every respect to leavened bread. The author concludes that yeasts are not essential in the leavening of bread, although they are usually present and presumably involved in the process.—*Anthony Berg*.

3063. CLARK, W. MANSFIELD, and BARNETT COHEN. Some elementary aspects of the putrescibility and similar tests. [Abstracts.] Absts. Bact. 6: 3. 1922.

3064. HEINEMAN, P. G., and CHARLES R. HIXSON. Bacteria concerned in the fermentation of corn silage. [Abstract.] Absts. Bact. 5: 6-7. 1921.

3065. JURITZ, CHAS. F. Bacterial production of motor fuel. South African Jour. Indust. 4: 905-910. 1 fig. 1921.—A number of experiments have been carried out with cultures of *Bacillus acetoehtylicus*; among other media, pineapple refuse and waste maize cobs were tested.—E. M. Doidge.

3066. KARRER, JOANNE L. Studies in the physiology of the fungi. XIII. The effect of hydrogen-ion concentration upon the accumulation and activation of amylase produced by certain fungi. Ann. Missouri Bot. Gard. 8: 63-96. Fig. 1-14. 1921.—Working with *Colletotrichum Gossypii*, *Penicillium italicum*, and *Fusarium* sp., Karrer has studied the amylase produced by these fungi, which require different ranges of active acidity for growth, with a view "to determine the effect of acidity and alkalinity upon the secretion and accumulation of the enzyme," and "to determine whether the enzymes produced under these conditions have similar activities in buffered solutions covering a range of H-ion concentrations, and whether there is any correlation between the optimum for activity and the optimum for secretion and accumulation."—The selected organisms were used because of the optimum acidity of the medium for each, it having been found that *Colletotrichum Gossypii* grows well on alkaline media, *Penicillium italicum* on acid media (pH 2.2-4.1), and *Fusarium* on a wide range varying from pH 2.8 to 10+. The fungi were grown on media suited to each for spore production, and spore suspensions having a standard number of spores were transferred by standard methods to a modified Czapek's solution for the production of mycelial mats for intracellular enzyme study. The filtered culture solution was used for the study of extracellular enzymes. Equal parts of the extracellular and intracellular enzyme suspensions were added to a series of equal amounts of a starch solution in equal amounts of buffer solutions of different pH values. After incubation for desirable periods the amylolytic activity was determined by an estimation of the reducing sugars present.—From such cultures it was possible to conclude that "A relation, which varies with the organism, seemed to exist between the H-ion concentration of the medium and the accumulation of extra- and intracellular amylase. In *Fusarium* sp., maximum total accumulation was produced in the solutions having an initial of pH 4.5 and a final reaction of pH 7.8, "whereas in *Colletotrichum Gossypii* * * * * an initial of pH 7.0 and a final of 7.9 afforded maximum results, but only slightly less accumulation occurred at pH 8.2. Culture solutions of pH. 3.0 and 4.5 were equally favorable in the case of *Penicillium italicum*. Amylase accumulated more abundantly in the cultures of *C. Gossypii* than in those of the other fungi studied. A gradual decrease in the amylase accumulation was effected by *Fusarium* as the culture solution became more alkaline, this decrease not being coincident with a reduction in the amount of growth. An increase in accumulation occurred in the intra- and extracellular amylase of *C. Gossypii* as the neutral solution became less acid, neutral or alkaline solutions being most effective. The intra- and extracellular amylase, produced by any one fungus under varying H-ion concentrations of the culture solution, had similar properties with respect to the effect of the reaction of the NaOH-H₃PO₄ buffer solution upon activation. An optimum zone of activity, between pH 3.0 and 6.0, existed for *P. italicum*, while in the other fungi the optimum was more sharply defined at pH 6.0 when the activity was measured at 28°C. for 24 hours. Complete inactivation occurred at pH 8.0 for the amylase of *P. italicum*. Under similar amounts of amylase accumulation by *Fusarium* and *C. Gossypii*, inactivation was effected by solutions of pH. 9.0 to 11.0. A decrease in the actual acidity of the culture solution occurred in all of the series of *P. italicum* and all but the most alkaline, or pH 9.2, series of *Fusarium* and *C. Gossypii*."—S. M. Zeller.

3067. KENDALL, A. I., A. A. DAY, and A. W. WALKER. Metabolism of *B. Welchii*, *Vibrio septique*, *B. fallax*, *B. tertius*, *B. tetani*, *B. pseudotetani*, *B. botulinus*, *B. bifermentans*, *B. oedematiens*, *B. aerofetidus*, *B. sporogenes*, *B. histolyticus*, and *B. putrificus*. Studies in bacterial metabolism. XLIV-LVI. Jour. Infect. Diseases 30: 141-210. 1922.—A study is reported of the metabolism of various pathogenic anaerobic bacteria, as indicated by the fermentation of carbohydrates, liquefaction of gelatin, formation of ammonia, change of amino-nitrogen content of medium, and change in titratable acidity, growth, and changes produced in milk.—Selman A. Waksman.

3068. LANTZSCH, KURT. *Bacillus amylobacter* A. et Bred. und seine Beziehung zu den Kolloiden. [Bacillus amylobacter and its relation to colloids.] Centralbl. Bakt. II Abt. 54 1-12. Fig. 1. 1921.—The time for germination of spores of *B. amylobacter* could be reduced from 51 days to 5-10 days,—in 1 instance to 3 days,—by adding a substance capable of going into colloidal suspension. Different soil types were partially sterilized by treatment with ether and chloroform and then inoculated with *B. amylobacter* spores. The colloidal content of each soil was measured by the methyl violet absorption method. The results are plotted in a curve to show the correlation between the amount of colloids present and the time required by the spores to produce fermentation. The author points out that the role played by the colloidal component of the culture medium is quantitative rather than qualitative; that the nature of the substance, whether clay, charcoal, or gelatin, is not as important as the amount. He also points out that a characteristic property of colloids in general rather than of the individual substance employed is here concerned. The effects of the absorbing properties of colloids on the availability of nutrients present and on the action of toxic products of metabolism are also discussed.—*Anthony Berg*.

3069. MORGULIS, SERGIUS. Is catalase a measure of metabolic activity? Amer. Jour. Physiol. 57: 125-134. 1921.—Duplicate experiments upon frogs kept at 5 and 20°C. demonstrated that catalase production is not materially greater in the frog kept at 20°C., though it should be if it were a measure of metabolic activity, since previous work has shown that the metabolic activity of frogs is 300-400 per cent greater with such a difference in temperature.—*Ernest Shaw Reynolds*.

3070. NELSON, J. M., AND DAVID L. HITCHCOCK. Uniformity in invertase action. Jour. Amer. Chem. Soc. 43: 2632-2659. 1921.—Invertase preparations from yeast differ in their action, some allowing the hydrolysis to slow up after the first 20 per cent of inversion. By means of an empirical equation it was found that the hydrolysis time-curves for normal invertase are of the same shape for the different invertase concentrations and can be made to superimpose, if the time scale is multiplied by the proper constant. "By the same method it has been shown that the hydrolysis curve, with normal invertase, has the same shape at temperatures varying from 15 to 35 degrees, and at hydrogen-ion concentrations from 4.0×10^{-5} to 32×10^{-7} ." It was found that 1 abnormal invertase preparation could be rendered normal by the presence of boiled normal invertase, or 0.1 mol. sodium chloride, while another was not affected by either.—Normal invertase preparations were not rendered abnormal by further dialysis or partial inactivation by heating, or by ultraviolet light.—*J. M. Brannon*.

3071. PATON, JULIA BAYLES. Pollen and pollen enzymes. Amer. Jour. Bot. 8: 471-501 1921.—The author discusses the present status of knowledge concerning the structure and chemical characteristics of pollen. Upon germination the pollen tube penetrates the style either (1) through an open stylar canal, (2) by making its way between the walls of adjacent cells or, more rarely, (3) by penetrating the cells themselves. In order to understand this behavior it is important to determine what enzymes are present in pollen. Pollen from 18 species of plants was tested for the presence of 13 kinds of enzymes and the methods used are described for each enzyme. Amylase, invertase, catalase, reductase, and pectinase were found in all. Pepsin, trypsin, erepsin, and lipase occur in some species but not in others. Cytase was doubtfully identified in 6 species. Zymase was found only in crab apple pollen, and tyrosinase and laccase were not found in any of the species studied. Attention is called to the presence of pectinase in all species and to the probable importance of this enzyme in digesting the middle lamella and thus allowing the tube to pass between the cells of the style.—Most pollen carries spores of bacteria and fungi but the author presents evidence that it is the pollen itself rather than these microorganisms which produces the enzymes studied.—*E. W. Sinnott*.

3072. SHERMAN, J. M., AND R. H. SHAW. The production of carbon dioxide and volatile acids by propionic bacteria with special reference to their action in cheese. [Abstract.] Absts. Baet. 6: 16. 1922.

3073. SHERMAN, JAMES M., and ROSCOE H. SHAW. The propionic acid fermentation. [Abstract.] Absts. Bact. 5: 6. 1921.—*Bacterium acidi-propionici* ferments lactose with the production of propionic acid, acetic acid, and carbon dioxide. In the presence of certain other bacteria and especially of *Lactobacillus casei* the production of propionic acid is greatly increased.—D. Reddick.

3074. SHUNK, I. V., and FREDERICK A. WOLF. The physiology of some plant pathogenic bacteria. II. Further studies on bacterial blight of soybean. North Carolina Agric. Exp. Sta. Tech. Bull. 20. 8-13. 1921.—This is a reprint from *Phytopathology* 11: 18-24. 1921 [see Bot. Absts. 8, Entry 2102] with supplementary notes on the decomposition of carbohydrates and on the fermentation of mannite and galactose by *Bacterium glycineum*.—F. A. Wolf.

3075. WARDEN, CARL C. The nature of alcoholic fermentation. Amer. Jour. Physiol. 57: 454-469. 1921.—Finely ground fibrin treated with sodium oleate under the experimental conditions given carried on fermentation in a 10 per cent dextrose solution. Other surfaces such as "fragments of porous earthenware and of pumice and of common sponge" when properly treated with the oleate also induced fermentation. The artificial yeast (fibrin and sodium oleate) and cultures of natural yeast were injected into rabbits and agglutination and precipitation tests made followed by fermentation tests. The results are tabulated. "It is believed that the experiments summarized in this paper warrant the tentative conclusions that alcoholic fermentation is due to a catalytic process operating at the surfaces of yeast cells, at the colloidal surfaces of yeast juice (zymase), and at artificial surfaces composed of specific fat complexes similar to those found to be present in yeast cells, and that the enzymes of yeast may be regarded as belonging to the cellular antigens."—Ernest Shaw Reynolds.

3076. WOLF, FREDERICK A., and A. C. FOSTER. The physiology of some plant pathogenic bacteria. V. The fermentative activity of some plant pathogenic bacteria in relation to hydrogen ion concentration. North Carolina Agric. Exp. Sta. Tech. Bull. 20. 25-43. 1921.—Consideration is given to the fermentative activity of these several organisms as influenced by initial reaction, concentration and kind of carbohydrate, concentration of buffer material, and mechanical agitation. All species are found to grow at a fairly uniform rate ranging from 0.25-0.5 generations hourly over a wide range of initial reaction. Furthermore, in plain bouillon all caused a progressive increase in alkalinity except *B. carotovorus*, which showed at first an increase in acidity.—The initial reaction modifies the final reaction. Fermentable sugars are not attacked with equal vigor, since the rate and amount of fermentation vary both with the species of organism and the amount of carbohydrate. The concentration of buffer materials is related to the minimum concentration of carbohydrate necessary to produce the final characteristic level of acidity.—F. A. Wolf.

METABOLISM (RESPIRATION, AERATION)

3077. LUND, E. J. Quantitative studies on intra-cellular respiration. V. The nature of the action of KNC on *Paramecium* and planaria with the experimental test of criticism, and certain explanations offered by Child and others. Amer. Jour. Physiol. 57: 336-349. 1921.—Contrary to the effects upon planaria, KNC has previously been shown not to have an inhibitory action on the oxygen consumption of *Paramecium*. The various criticisms of Child are answered by reference to statements of experimental results in previous papers. That the death of *Paramecium* in KNC is not due to its alkalinity is shown by the comparative effects of KOH and KNC in corresponding pH concentrations. Up to 153 hours those in KOH at pH 8.4-9.6 were in normal condition while all had died in KNC solutions at pH 8.2-9.4. Similarly there is no trace of a stimulatory action on oxygen consumption in the increasing alkalinity of KOH solutions. HCl was also used to neutralize the alkalinity of KNC solutions and when compared with check cultures it is evident that the accelerated oxygen consumption in KNC solutions is not due to their alkalinity. Well nourished paramecia, planaria, etc., are more resistant to the toxic effects of KNC than starved ones. "The assumption by Child that

the rate of respiration in the body wall of planaria is not primarily affected by feeding, and that KNC only or primarily affects the body wall and superficial structures is not correct," as shown by experiment.—*Ernest Shaw Reynolds.*

3078. NICHOLS, H. J., and C. B. WOOD. The production of CO₂ by the typhoid bacillus and the mechanism of the Russell double sugar tube. II. Fermentation or respiration. Phenol red as an indicator. *Jour. Infect. Diseases* 30: 320-322. 1922.

3079. POWERS, EDWIN B. The physiology of the respiration of fishes in relation to the hydrogen ion concentration of the medium. *Jour. Gen. Physiol.* 4: 305-317. *Fig. 1-3.* 1922.

ORGANISM AS A WHOLE

3080. DIETEL, P. Versuche über Keimungsbedingung der Teleutosporen einiger Uredineen. IV. [Investigations of factors influencing the germination of teleutospores of certain Uredineae. IV.] *Centralbl. Bakt. II Abt.* 54: 215-219. 1921.—Leaves of *Salix Capraea* infested with *Melampsora Larici-Capraearum* were collected at various intervals during the winter months. The spores could be made to germinate after a process of alternate moistening and drying. Material collected late in the season germinated with fewer treatments than that collected earlier. The spores do not germinate in the absence of oxygen. The author thinks it is probable that under the influence of weathering the nature of the protoplasm is changed by the absorption of oxygen.—*Anthony Berg.*

3081. ERICKSON, M. J., and H. ALBERT. Cultivation of the gonococcus. *Jour. Infect. Diseases* 30: 268-278. 1922.—A study is reported of the influence of composition of media, oxygen tension, and presence of dyes on the isolation and cultivation of *Gonococcus*.—*Selman A. Waksman.*

3082. KOJIMA, HITOSHI. Serobiologische Untersuchungen über die Verwandtschaftsverhältnisse zwischen den Dikotyledonen und Gymnospermen. [Serobiological investigations of the relationship between dicotyledons and gymnosperms.] *Mitteil. Med. Fakultät K. Kyushu-Univ.* 6: 223-254. 1921.—Employing the methods of Kowarski, Magnus und Friedenthal, Koketsu, and others, it was attempted to determine relationship by means of the protein precipitation tests. The protein extracts were made from the seed and contained in general more than 0.1 per cent protein, and these were diluted to approximately this figure. The precipitation reaction was the so-called ring test of Fornet. Fifty-two dicotyledons were employed as sources of experimental extracts, these plants ranging in taxonomic sequence all the way from Myricaceae to Compositae and antisera upon which these were allowed to act were prepared of the following gymnosperms: *Cycas revoluta*, *Ginkgo biloba*, *Podocarpus macrophylla*, *Torreya nucifera*, *Abies firma*, *Larix leptolepis*, *Pinus densiflora*, and *Chamaecyparis obtusa*. Similar sera were prepared from *Pasania cuspidata*, *Magnolia hypoleuca*, and *Daucus Carota*. Immune sera were secured by injection into guinea pigs of the preparations mentioned. In the precipitation tests comparison was made with normal guinea pig serum plus the extract, with immune serum plus physiological salt solution, and with immune serum plus normal guinea pig serum. The precipitation was observed 4 times after intervals of from 15 minutes to 2 hours. As a result of the extensive tests made it was shown that in general dicotyledons are widely separated from the gymnosperms. Among gymnosperms, however, *Cycas* is more closely related to many dicotyledons, especially to *Magnolia*.—*B. M. Duggar.*

3083. MAGROU, J. Symbiose et tuberisation. [Symbiosis and tuberformation.] *Ann. Sci. Nat. Bot.* 3: 181-296. *Pl. 1-9, fig. 1-9.* 1921.—Noël Bernard has shown that the formation of tubers which appear in different stages of development of the orchids is connected with the cryptogamic symbiosis to which these plants are obligatorily subjected. With this idea, and supported further by statistical studies which reveal the constant presence of symbiotic fungi with such wild plants as are provided with perennial organs, the author proposes to

regard the appearance of the perennial state as a consequence of the extreme adaptation of these plants to a commensal life with fungi.—He applied himself to determine whether the hypothesis of the parasitic origin of perennial organs, demonstrated in the case of the orchids, could be experimentally verified in other groups of plants. The principal results of his investigations may be summarized as follows: (1) In the Irish potato and *Orobis tuberosus* developed from seed the establishment of the symbiosis with the endophytic fungus induces the tuberization of buds at the base of the stem. If these plants are subjected to the action of the symbiotic fungi without varying the other conditions of their life these same buds are differentiated into slender stems and do not produce tubers. (2) While the evolutionary cycle of the potato is characterized by marked alternation of the phases of differentiation and of tuberization, in *Orobis tuberosus* the tubers once formed continue to grow indefinitely. The first of these types of development is connected with an intermittent symbiosis, the second with a continuous symbiosis. (3) Different plants (Irish potato, *Orobis tuberosus*, *Ophrydeae*) may, as may be seen from the preceding, adopt 2 modes of development, whether they are or are not subjected to symbiosis. In the 1st case they are reduced to a unique aerial stem and produce perennial organs at the expense of basal buds; in the 2nd they are branched from the base and do not possess perennial organs. There exist some examples of the species of the same genus, such as *Mercurialis perennis* and *M. annua*, which are distinguished essentially by vegetative characters of the same order; in which case again the same relation as above is found between symbiosis and the form of the plant. (4) From the relative statistics as to the distribution of mycorrhiza there is the general rule that the wild perennial plants harbor fungi, while annual plants do not. The study of 3 annual plants (*Orobis coccineus*, *Mercurialis annua*, *Solanum nigrum*) show that these, likewise their perennial relatives, can be invaded by the endophytes, but the former free themselves totally after a brief period by an energetic phagocytosis. (5) In all cases studied symbiosis may be defined as the limit toward which the association of 2 commensals tends when their reciprocal action is in equilibrium. Plants resist, with diverse success, the attacks of the fungi in putting into action successfully the processes of mechanical, cellular, and humoral immunity,—the essential reactions which characterize immunity in animal diseases.—As a result of this assemblage of facts certain of the specific characters of plants, such as the property of producing tubers, are dependent upon symbiosis. If the action of this external factor is modified or suppressed the characters vary or degenerate correspondingly. There is then an undeniable factor of variation which, in producing the appearance or the disappearance of the perennial state to a different extent in the vegetable kingdom, has enjoyed a preponderating role in the formation and evolution of species.—*E. Foëx*.

3084. MATSUMOTO, TAKASHI. Studies in the physiology of the fungi. XII. Physiological specialization in *Rhizoctonia Solani* Kuhn. Ann. Missouri Bot. Gard. 8: 1-62. 1921.—Matsumoto presents the results of his study of the morphology and physiology of 15 isolations of *Rhizoctonia*. From the macroscopical and microscopical study of these cultures obtained from a wide range of hosts from different localities, it was possible to reduce the number of types to 6 for further physiological study.—The digestive complex of the cultures of *Rhizoctonia* was studied through the enzyme activity. All strains studied hydrolyze starch but the diastatic activity varies in different strains. All convert cane sugar and utilize glucose, fructose, galactose, and amygdalin as sources of carbon. It was demonstrated that cellulase is present but inulin is not utilized. Various organic nitrogenous nutrients were tested as sources of nitrogen, with variable results. Peptone and casein are generally favorable nitrogen sources. Trypsin and erepsin were demonstrated to be present in the mycelium of all the strains studied. Among the inorganic nitrogenous salts potassium nitrate evidently is preferable. "As a whole the mycelial growth is more sensitive to modification in the carbohydrate supply than to changes in the nitrogen supply."—*Rhizoctonia Solani* reacts favorably to acid media of about pH 3.8, the active acidity usually increasing with growth.—Fusion of hyphae in the mycelium is a common occurrence between closely related strains. Inadequate aeration tends to repress sclerotial formation and mycelial development.—From inoculation experiments it was found that pathogenicity is more or less modified by transfer to a host

plant markedly different from that on which the organism was originally found, but the highest capacity for infection is found to be manifest by the fungus when the inoculation is made on the species of host upon which the strain originated. Entrance to the host is chiefly gained directly through the cuticle by mechanical pressure, and takes place more readily through roots than through other parts of the host.—*S. M. Zeller*.

3085. REHFOUS, L. Etudes sur l'action de conditions extrêmes sur la structure du stomate de *Zea mays*. [Studies on the effect of extreme conditions on the structure of the stomata of *Zea mays*.] Bull. Soc. Bot. Genève 12: 130. 1920.—This is merely an announcement of the work, the details of which are to be published in a later issue of the Bulletin.—*W. H. Emig*.

3086. WOLF, FREDERICK A. The physiology of some plant pathogenic bacteria. VI. The application of certain recent studies on technic to methods of culture of plant pathogenes. North Carolina Agric. Exp. Sta. Tech. Bull. 20. 44-47. 1921.—This paper points out the application of certain recent studies to such practices and phenomena as adjustment and measurement of reaction, preparation of agar media, also media containing carbohydrates, determination of thermal death point, nitrate reduction, tolerance to acid and alkali, and aerobism.—*F. A. Wolf*.

GROWTH, DEVELOPMENT, REPRODUCTION

3087. BEAUVERD, G. Notes sur deux cas de floraison d'un *Sempervivum arachnoideum*. [Notes on the flowering of *Sempervivum arachnoideum*.] Bull. Soc. Bot. Genève 12: 155-156. 1920.—The paper records observations on the flowering habit of a potted plant under various conditions.—*W. H. Emig*.

3088. GOODMAN, E. L., and M. MOORE, Cultivation of tubercle bacilli. Jour. Infect. Diseases 30: 58-63. 1922.—Details of growth results in the cultivation of the human tubercle bacillus are given.—*Selman A. Waksman*.

3089. HENRICI, ARTHUR T. A statistical study of the form and growth of a spore-bearing bacillus. [Abstract.] Absts. Bact. 6: 8-9. 1922.

3090. HENRICI, ARTHUR T. A statistical study of the form and growth of a spore-bearing bacillus. Proc. Soc. Exp. Biol. and Med. 19: 132-133. 1921.—Cells of *Bacillus megatherium* were measured and counted. Those inoculated on agar from a 12-hour agar culture began to increase in size during the lag phase, reaching a maximum length about 6 times that of inoculated cells shortly after the beginning of the maximum growth phase, then rapidly becoming shorter. During period of increase in length, frequency curves showed bimodality. Inoculations into broth made from a 7-hour agar culture showed no lag phase and increased in size to a less extent than the agar cultures.—*M. M. Brooks*.

3091. LILLIE, RALPH S. Growth in living and non-living systems. Sci. Monthly 14: 113-130. 1922.—Even when an organism has ceased to "grow" it continues to renew its own substance and repairs losses. So the adult organism may be considered as still "growing" but the growth is "latent." This is the fundamental process in all life.—The chromosome theory of heredity is probably true even if it is not the whole truth. But growth and heredity in their most general aspects must be independent of special mechanisms of this kind. Chromosomes themselves grow and reproduce themselves. Growth and differentiation are inseparable.—Resemblances between organic growths and precipitation growths are of a general rather than a particular kind. Yet in both the specific features of growth are referable to the specific peculiarities in the chemical composition of the structural material.—Recent investigations give evidence that the electric current influences growth movements in higher plants and nerve cells. It seems reasonable to infer that the natural or physiological methods of control in normal growth and development are also in large part electrical.—*L. Pace*.

3092. MACDOUGAL, D. T. The distentive agencies in the growth of the cell. *Proc. Soc. Exp. Biol. and Med.* 19: 103-110. 1921.—Mixtures of carbohydrates, proteins, soaps, and lipoids are capable of forming a reversible gel the swelling of which is influenced by a series of agents in the same way as that of living and dead cells. These substances are present in protoplasm. Growth is considered to consist of 2 phases, swelling and vacuolation, which are fundamentally the same as osmosis and syneresis respectively. An artificial cell may be made by lining a porous container, such as platinum gauze, parchment thimbles, or wooden or clay cups, with a coating of a gel consisting of a mixture of agar, gelatin, K or Ca oleate, and lecithin, or some of these. When such a cell is placed in, and filled with, water the gel dissolves, water enters the artificial cell and may be discharged at the top in quantities finally amounting to $2\frac{1}{2}$ times the capacity of the cell. Passage of water is at the expense of continued solution of gel. Such cells may be initially isotonic with 0.003 M KCl, that is, with this concentration they will at first take in no water, but will in time become active, and by transfer to KCl solutions of successively greater concentrations may finally be made to absorb water from 0.005 M KCl. Artificial cells may be made to exhibit "negative osmosis" by proper selection of the outer wall material. The cell wall in plants may be quite impermeable to salts and therefore affect the relation of the cell protoplasm to its environment.—*M. M. Brooks.*

3093. REHFOUS, LAURENT. Sur la périodicité des bourgeons non protégés. [The periodicity of unprotected buds.] *Bull. Soc. Bot. Genève* 12: 319-336. *Fig. 1-6.* 1920.—From a study of the unprotected buds of *Viburnum lantana* and *Pterocarya caucasia* the author concludes that periodicity is a property fixed by heredity more or less independent of the conditions of the environment.—*W. H. Emig.*

3094. RIVERS, T. M. Further observations on the growth requirements of certain so-called hemophilic bacilli. [Abstract.] *Absts. Bact.* 6: 3. 1922.

3095. WILLIAMS, ANNA W., and OLGA POVITZKY. Growth requirements of *B. influenzae*. [Abstract.] *Absts. Bact.* 6: 34-35. 1922.

TEMPERATURE RELATIONS

3096. DICKSON, ERNEST C., and GEORGINA S. BURKE. Botulism. A method for determining the thermal death time of the spores of *Bacillus botulinus*. *Proc. Soc. Exp. Biol. and Med.* 19: 99-101. 1921.—A method is described for eliminating contamination of tubes inoculated with *B. botulinus* spores.—*M. M. Brooks.*

3097. EDMONDSON, RUTH B., L. T. GILTNER, and CHARLES THOM. *Bacillus botulinus*: Relation of toxin production to temperature. [Abstract.] *Absts. Bact.* 6: 23. 1922.

3098. HAWKINS, LON A. Effect of temperature on the resistance to wounding of certain small fruits and cherries. *U. S. Dept. Agric. Bull.* 830. 6 p. 1920.—Experiments with a modified Joly balance showed that strawberries and other fruits which had been cooled in a refrigerator were more resistant to puncture with a glass needle than those at room temperature.—*Mildred L. Johnson.*

3099. WOLF, FREDERICK A., and A. C. FOSTER. The physiology of some plant pathogenic bacteria. IV. Thermal death points of some bacterial plant pathogens in relation to reaction of the medium. *North Carolina Agric. Exp. Sta. Tech. Bull.* 20. 21-24. 1921.—This paper shows that variations of 4-6°C. between pH 5.4 and 9.0 occur in thermal death points of *Bacillus carotovorus*, *Bacterium glycineum*, *B. Sojae*, *B. campestre*, *B. tabacum*, and *B. angulatum*.—*F. A. Wolf.*

3100. WRIGHT, R. C., and R. B. HARVEY. The freezing point of potatoes as determined by the thermoelectric method. *U. S. Dept. Agric. Bull.* 895. 7 p. 1921.—Eighteen varieties of potatoes were tested, using the thermoelectric method. Results showed that (1) the freez-

ing points varied with the variety, but were often similar in closely related groups, and (2) early varieties had a higher freezing point than late ones, but in any given variety this rose as the season advanced.—*Mildred L. Johnson.*

RADIANT ENERGY RELATIONS

3101. REDFIELD, ALFRED C., and ELIZABETH M. BRIGHT. The effects of radium rays on metabolism and growth in seeds. *Jour. Gen. Physiol.* 4: 297-301. 1922.—Radish seed (*Raphanus* spp.) in dry condition were exposed to the beta-rays of radium emanations and 2 days later the seed were moistened and the rate of CO₂ production determined. The rate of CO₂ production in radiated seed was invariably greater than in the corresponding unirradiated control. Germination tests showed that radiation retards germination and that many seed may be prevented from germinating. The authors conclude: (1) No direct relation exists between the effect of beta-rays of radium on CO₂ metabolism and growth in radish seed. (2) Changes in the rate of CO₂ production and cell division do not always go hand in hand. (3) It is the specific action of radiations on certain physiological processes in contrast to others which accounts for the characteristics of these effects.—*O. L. Inman.*

3102. STEEL, THOS. Electric light and vegetation. *Nature* 106: 694. 1921.—It was reported by Cheel [*Australian Nat.* 2: 117. 1912] that plane trees growing near large electric lights showed delay both in acquiring and shedding leaves on branches next the light.—*O. A. Stevens.*

TOXIC AGENTS

3103. B., B. T. P. Toxic root-interference in plants. *Nature* 106: 666-667. 1921.—This is a brief account of the work of Spencer Pickering at Woburn.—*O. A. Stevens.*

3104. BOTTGER, HILDUGUNG. Über die Giftwirkungen der Nitrate auf niedere Organismen. [On the toxic action of nitrate salts on lower organisms.] *Centralbl. Bakt.* II Abt. 54: 220-261. 1921.—The author describes work on the toxicity of solutions of varying concentration of K, Na, Mg, and Ca nitrates on certain species of denitrifying bacteria, pellicle-forming and alcohol-forming yeasts, and molds. The upper and lower limits of toxicity were found to be specific characteristics. It was shown for a species of *Saccharomyces* that the upper limit can be raised through habituation. Toxicity was partly conditioned by the nature of the medium in which the organism was growing; for yeasts growing in a synthetic nutrient the toxicity of nitrate solutions of increasing concentration rose more rapidly than for yeasts growing in plant juices; and among the latter, cultures in prune mash proved more susceptible than cultures in raisin mash. Furthermore, different functions are often unequally affected, as growth activity and fermentation activity in the yeasts, and conidial formation and perithecial production in the case of *Aspergillus glaucus*. Nitrate solutions of sufficient concentration were found to have a toxic action both for organisms which utilize nitrates and organisms (such as the alcohol-forming yeasts) which do not utilize them. On the other hand, the stimulative action of the nitrate solutions of lower concentration was noted only in the case of the organisms for which the salts have a nutritive value. Parallel tests with nitrate salts and with sulphate salts indicated that osmotic pressure played only a very limited role in producing the toxic effects noted. The toxic properties of the nitrate salts employed would be chiefly due to the action of the metallic ion. But even after taking into consideration effects of osmotic pressure and the action of the basic ion, there still remains a certain measure of toxic action to be accounted for. The author is inclined to ascribe this to the action of the NO₃ radicle.—*M. A. Raines.*

3105. COHEN, BARNETT. Some phases of the disinfection theory. *Proc. Soc. Exp. Biol. and Med.* 19: 77-78. 1921.—Comparisons are made between the resistance of *B. coli* and that of *B. typhosus* when subjected to various conditions. The results illustrate the law of mass action.—*M. M. Brooks.*

3106. DeWITT, L. M. The inhibitory action of certain organic mercury compounds on the growth of human tubercle bacilli. *Jour. Infect. Diseases* 30: 363-371. 1922.—The inhibitory action of mercury compounds on the growth of human tubercle bacilli was tested by adding to tubes of a sterile glycerol agar enough of the compound to make dilutions from 1:100 to 1:1,000,000; the tubes were well shaken, slanted, cooled, inoculated, incubated, and examined after 15, 30, and 45 days. The power of phenol to inhibit growth was found to be greatly increased by the substitution of a mercury salt in place of one of the hydrogens, or a mercury united by one bond to carbon; it was also increased by the substitution of 1 NO₂ group for 1 hydrogen in the ring; the position of the NO₂ group as well as of the mercury group in the ring is of importance. The same is true of the more complex aromatic compounds.—*Selman A. Waksman*.

3107. KOSER, S. A., and W. W. SKINNER. Viability of the colon-typhoid group in carbonated water and carbonated beverages. [Abstract.] *Absts. Bact.* 5: 12. 1921.—Carbonation causes rapid diminution in the number of *B. coli*, *B. typhosus*, and *B. Schottmülleri* in water.—*D. Reddick*.

3108. LEVINE, MAX. Does bile inhibit or stimulate growth of the colon group? [Abstract.] *Absts. Bact.* 6: 37. 1922.—With evaporated bile, concentrations up to 1.5 per cent stimulated growth of *Bacterium coli* and *B. aerogenes*, a concentration of 2 per cent stimulated the former and inhibited the latter, and higher concentrations were inhibitive to both.—*D. Reddick*.

3109. MASUECI, P. Phenol and cresol as preservatives in biologic products. *Jour. Infect. Diseases* 30: 379-387. 1922.—A study is made of cresol, ether-cresol, phenol, and ether-phenol as preservatives of biological products.—*Selman A. Waksman*.

3110. WOLF, FREDERICK A., and I. V. SHUNK. The physiology of some plant pathogenic bacteria. III. Tolerance to acids of certain bacterial plant pathogens. *North Carolina Agric. Exp. Sta. Tech. Bull.* 20. 14-20. 1921.—This is a reprint from *Phytopathology* 11: 244-250, which contains in addition a discussion of the several factors which modify the inhibition of bacteria by acids.—*F. A. Wolf*.

MISCELLANEOUS

3111. ANONYMOUS. Flowers that flash. *Sci. Amer. Monthly* 4: 35-36. 1921.—This is a semi-popular article on the so-called "electric" flashes of light given off by certain flowers, first described by Elizabeth Linnaeus in 1762.—*Chas. H. Otis*.

3112. ACREE, S. F., and R. R. MELLON. A stable single buffer solution. [Abstract.] *Absts. Bact.* 5: 5. 1921.

3113. BUSHNELL, L. D. An apparatus for the study of the biochemical changes produced by anaerobes. [Abstract.] *Absts. Bact.* 6: 10. 1922.—The apparatus and method are described in detail.—*D. Reddick*.

3114. CHAMBERS, ROBERT. Apparatus for micro-manipulation and micro-injection. [Abstract.] *Absts. Bact.* 6: 10-11. 1922.—The apparatus is designed for dissecting living cells or for injecting substances into them, and for isolating microorganisms. The micro-injection instrument is described in necessary detail.—*D. Reddick*.

3115. CHAMBERS, ROBERT. Apparatus for micro-manipulation and micro-injection. *Proc. Soc. Exp. Biol. and Med.* 19: 85-87. 1921.

3116. FABIAN, FREDERICK W., and ROSS C. STULL. A study of hydrogen-ion concentration of different kinds of glassware when sterilized with buffered and non-buffered solutions. [Abstract.] *Absts. Bact.* 5: 210. 1921.—The H-ion concentration of a non-buffered solution

changed from pH 7.0 to pH 9.8 when sterilized in new glassware. A buffered solution sterilized in the same glassware showed no change or a slightly greater acidity.—*D. Reddick*.

3117. ITANO, ARAO. A micro-electric method for the determination of carbon dioxide. [Abstract.] *Absts. Bact.* 5: 5. 1921.

3118. LUND, E. J. A micro-Winkler method for the quantitative determination of dissolved oxygen. *Proc. Soc. Exp. Biol. and Med.* 19: 63-64. 1921.

3119. MYERS, VICTOR C. A modified Hellige colorimeter for the comparison of solutions containing two colors. *Proc. Soc. Exp. Biol. and Med.* 19: 78-79. 1921.—An additional standard wedge is introduced in the Hellige colorimeter which aids in color detection; the accuracy in reading is \pm pH 0.02-0.04. It is useful for urine, blood, gastric juice, and bacteriological culture media determinations.—*M. M. Brooks*.

3120. SLAGLE, E. A., and S. F. ACREE. A simplified hydrogen electrode potentiometer outfit. [Abstract.] *Absts. Bact.* 5: 5. 1921.

3121. WOLF, FREDERICK, and I. V. SHUNK. The physiology of some plant pathogenic bacteria. I. Solid culture media with a wide range of hydrogen and hydroxyl ion concentration. *North Carolina Agric. Exp. Sta. Tech. Bull.* 20. 3-7. 1921.—This paper is reprinted from *Jour. Bact.* 6: 325-330. 1921, and is supplemented by a short note on the adjustment of reaction of cooled sterile media.—*F. A. Wolf*.

SOIL SCIENCE

A. G. McCALL, *Editor*

(See also in this issue Entries 2070, 2093, 2095, 2117, 2118, 2119, 2123, 2127, 2129, 2134, 2135, 2138, 2148, 2150, 2165, 2166, 2167, 2169, 2181, 2194, 2197, 2198, 2203, 2283, 2285, 2286, 2287, 2290, 2365, 2506, 2507, 2511, 2513, 2524, 2558, 2568, 2770, 2820, 2894, 2908, 2962, 3006, 3014, 3044, 3045, 3068)

3122. ANDREWS, E. A. Spontaneous ignition of peaty soils. *Nature* 109: 77-78. 1922.—In Assam depressions between hillocks, known as "bheels" and filled with peaty deposits, are frequently planted to tea. After being drained they frequently become very dry in certain seasons, and when the soil is exposed by pruning and clean cultivation, spontaneous combustion occurs. Tea is frequently killed but no ignition of bushes above ground occurs.—*O. A. Stevens*.

3123. BLACKSHAW, G. N. Green manuring and soil management. *Rhodesia Agric. Jour.* 18: 455-460. 1921.—The successful management of arable land is dependent on: (1) the provision and maintenance in the soil of an adequate supply of humus; (2) the addition of plant food in which the soil is deficient; (3) thorough tillage; and (4) the correction of reaction when necessary in order to promote the growth of beneficial microorganisms. Observations are recorded which indicate the importance of turning under a green manuring crop while the land is still moist in order to ensure the decomposition of the vegetable matter before the succeeding crop is planted.—*E. M. Doidge*.

3124. BLACKSHAW, G. N. Magnesia impregnated soils. *South African Jour. Sci.* 17: 171-178. 1921.—Certain soils occurring on the so-called Great Dyke in Southern Rhodesia have an abnormally large amount of magnesia, the amount of magnesia exceeding that of lime. The cost of an adequate lime dressing is prohibitive at the present time. Kaffir corn (*Sorghum vulgare*), velvet beans (*Stylobium* spp.), pearl millet (*Pennisetum spicatum*), and groundnuts (*Arachis hypogea*) have thrived fairly well on untreated soil.—*E. M. Doidge*.

3125. CARR, R. H., H. S. COPELAND, and E. GENTZLER. Fertility of soils of Hancock County, Indiana. *Proc. Indiana Acad. Sci.* 1919: 99-106. 1921.

3126. CHEVALIER, AUG. Études sur l'irrigation en Afrique occidentale. [Irrigation studies in West Africa.] *Rev. Bot. Appl.* 1: 103-121. 1921.—[Rev. of a number of recent papers on irrigation in tropical Africa.]

3127. CHRISTMAS, W. D. Rainfall and drainage at Rothemsted in 1921. *Nature* 109: 107. 1922.—The author cites percolation data. Evaporation during 12 months was 63 to 65 per cent of the rainfall, as compared with a normal of about 50 per cent. This was probably due to the excess of sunshine, which was about 26 minutes per day above the average.—O. A. Stevens.

3128. CONN, H. J. Methods for determining the causal organism in the case of any biological activity in soil. [Abstract.] *Absts. Bact.* 6: 14. 1922.—This is a restatement of postulates proposed previously [*Science* 16: 252-255. 1917].—D. Reddick.

3129. DEEMER, R. B. Report on borax in mixed fertilizers. *Jour. Assoc. Official Agric. Chem.* 5: 86-88. 1921.—This is a report on results obtained by the Chapin method for determining borax.—F. M. Schertz.

3130. FISCHER, HERMANN. Über die Einwirkung saurer Humusstoffe auf die biologischen Vorgänge im Boden und im Wasser. [The action of acid humus substances on the biological processes in soil and water.] *Centralbl. Bakt.* II Abt. 54: 481-486. 1921.—When humus extracts from acid moorlands were added to nutrient cultures subsequently inoculated with nitrogen-fixing organisms, no nitrogen fixation took place, even in cultures that were neutralized with calcium carbonate. In other cultures, made acid with acid phosphate, nitrogen fixation took place. It is therefore not only the concentration of the H-ions in soil and water that hinders nitrogen fixation, but also the presence of humus substances in solution.—Anthony Berg.

3131. FRAPS, G. S. Availability of potash in some soil-forming minerals. *Texas Agric. Exp. Sta. Bull.* 284. 16 p. 1921.—Availability of substances in the soil is not determined by the quantity or concentration of these substances, but must be referred to the plant. From the results of 3 series of experiments in which corn, cotton, millet, and sorghum were used, it is concluded that there is a relation between the potash removed by the crops and the potash dissolved from minerals by $\frac{N}{5}$ nitric acid. Minerals which contain potash easily soluble in strong hydrochloric acid give up their potash more readily to plants than those which contain potash less soluble in strong acid. One series in which granite was used confirmed the earlier work of the Rhode Island Station to the effect that this material has little or no value as a fertilizer.—L. Pace.

3132. FRAPS, G. S. Relation of soil nitrogen, nitrification, and ammonification to pot experiments. *Texas Agric. Exp. Sta. Bull.* 283. 51 p. 1921.—This bulletin reports pot experiments on the relation of the total nitrogen of the soil, the nitrogen available in the form of nitrates, and the nitrogen available in the form of ammonia, to the nitrogen removed by crops. The weight of nitrogen removed by 4 crops increases with the percentage of total nitrogen in the soil, the 1st crop being much larger than succeeding ones. On an average, non-acid soils yield more nitrogen to crops than acid soils. There is a close relation between the amount of nitrogen removed by the 1st crop and the available nitric nitrogen. Only 20 of the 233 soils used had more than 5 parts per million of ammonia nitrogen, including that originally present in the soil. With a few of the soils the determination of ammonia nitrogen offers some information, but with the majority the determination gives no particular aid and as a rule appears unnecessary. Addition of carbonate of lime may increase the nitrification of some soils which produce less nitric nitrogen than the amount taken up by the crops, but the amount

of nitrates produced may also greatly exceed the amount of nitrogen taken up by the crops.—*L. Pace.*

3133. GAINNEY, P. L. A study of some factors controlling the presence of *Azotobacter* in soils. [Abstract.] *Absts. Bact.* 6: 14. 1922.—*Azotobacter* gradually disappears from soils the reaction of which is less than pH 6.0.—*D. Reddick.*

3134. GAINNEY, P. L. Correlation between the presence of *Azotobacter* in a soil and the hydrogen-ion concentration of the soil. [Abstract.] *Absts. Bact.* 6: 14-15. 1922.—The maximum hydrogen-ion concentration tolerated by *Azotobacter* in soils is very near pH 6.0.—*D. Reddick.*

3135. GEIB, W. J., ARTHUR E. TAYLOR, GUY CONDREY, and W. M. GIBBS. Soil survey of Rock County, Wisconsin. Advance Sheets Field Operations Bur. Soils U. S. Dept. Agric. 1917: 5-50. *Fig. 1., map (colored).* 1920.—[This survey covers the same topics as Entry 3144.]

3136. GRIFFITH, J. J. Liming: with special reference to the uses of ground limestone. *Jour. Ministry Agric. Great Britian* 28: 341-349. 2 *fig.* 1921.

3137. HALL, THOMAS D. Nitrification in some South African soils. *Soil Sci.* 12: 301-363. 10 *fig.* 1921.—Determinations of nitrification in 54 South African soils show that it is less than is generally reported for the humid soils of the U. S. A. or for most of the soils from semi-arid regions of California or Colorado. Nitrification in the cultivated soils was generally superior to that of virgin soils. No relationship could be established between the nitrifying power of a soil and its organic matter, nitrogen content, hygroscopic coefficient, or rainfall. There appeared to be a relationship between nitrifying power and the lime-requirement as determined by the Veitch method.—*W. J. Robbins.*

3138. HALL, THOS. D. The lime requirements of soil and plant. *Jour. Dept. Agric. Union South Africa* 4: 141-152. 1922.

3139. HARRIS, F. S. The value of barnyard manure on Utah soils. *Utah Agric. Exp. Sta. Bull.* 172. 21 *p., 12 fig.* 1920.—The use of manure under dry-farming conditions is not so immediately profitable as under irrigation, but the residual effect under dry-farming conditions is very marked. Better use is made of manure when it is applied to sugar-beets or potatoes than when applied to cereals. Applications of 5 tons to the acre give the greatest returns per ton of manure with all of the crops tested, although heavier applications give somewhat higher total yields.—*B. L. Richards.*

3140. HARRIS, F. S., and N. I. BUTT. The use of alkali water for irrigation. *Utah Agric. Exp. Sta. Bull.* 169. 41 *p., 16 fig.* 1919.—Results in different soils show that wheat should not be irrigated with water containing as much as 1,000 parts per million of sodium carbonate and that even 500 parts will reduce growth. More than 1,000 parts per million of sodium chloride and more than 4,000 parts per million of sodium sulphate proved to be harmful after 2 or 3 years when none of the water added was allowed to drain off. A mixture of these 3 salts proved to be less toxic than the most harmful, and more toxic than the least harmful of the individual salts. Dilute concentrations of the salts often stimulated plant growth.—*B. L. Richards.*

3141. HOAGLAND, D. R. Soil analysis and soil and plant interrelations. *California Agric. Exp. Sta. Circ.* 235. 7 *p.* 1922.—The soil should not be regarded simply as a storehouse of plant foods, with a value to be assessed according to the total supply of these elements present. A more accurate analogy is that of an exceedingly complex and constantly changing chemical system in which the chemical processes of the soil and of the plant have an intimate relation. The soil minerals enter into solution at a rate which is dependent on many factors, such as carbon dioxide production by microorganisms and by the plant, nitrate production,

rates at which the plant absorbs the various elements, temperature, moisture, etc. In other words, the growth of the plant is determined by the nature of the chemical changes taking place in the soil and plant, and not by the percentage composition of the soil. No method of analysis applicable to individual samples of soil can yield the kind of information which it is essential to possess in order to draw any useful or reliable conclusion concerning plant growth.—A. R. C. Haas.

3142. HURD, Wm. D. **Problems of soil improvement.** Bull. Delaware State Bd. Agric. 10³: 91-97. 1921.—The author discusses the fundamentals of soil improvement, emphasizing the need of drainage, the use of high grade fertilizers, lime, and manure.—T. F. Manns.

3143. HUTCHINSON, H. B., and E. H. RICHARDS. **Artificial farm-yard manure.** Jour. Ministry Agric. Great Britain 28: 398-411. 2 fig. 1921.

3144. HUTTON, F. Z., and EARL NICHOLS. **Soil survey of Traill County, North Dakota.** Advance Sheets Field Operations Bur. Soils U. S. Dept. Agric. 1918: 5-45. Pl. 1, fig. 1-2, map (colored). 1920.—Traill County is situated in the extreme eastern part of North Dakota. The topography is level to gently undulating over most of the area. Practically the entire area is included in the Red River lowland. The range in elevation is about 200 feet. The ruling elevation is 961 feet above sea level.—The regional drainage is young in point of age, consequently there is no well developed system of tributaries. The western part is well drained but the drainage of the entire eastern part is deficient.—The climate is characterized by extremes in temperature. Records, covering a period of 9 years, show a range of 145-149°F. in temperature. The mean temperature is 40°F. The normal annual rainfall is reported to be about 22 inches. The growing season averages 130 days.—The soils are grouped according to origin into lacustrine, delta, glacial, and alluvial. The Fargo series is the most important lacustrine soil. The series includes types with black soils and dark drab or mottled drab and gray heavy subsoils. The delta soils include the Bearden and Sioux series. The types included in the Bearden series are characterized by brown to black surface soils overlying gray or yellow or light-brown subsoils. The Sioux series consist of dark brown to black surface soils with lighter colored subsoils, underlain by gravel beds sufficiently near the surface to have a marked effect upon drainage and to cause crops to suffer in times of drought. The Barnes series is derived from glacial till. This series includes types with black to dark-brown soils and gray, yellow, greenish-yellow or brownish yellow, highly calcareous subsoils. The Webster series appears to be glacial drift. This series includes types having black surface soils, underlain by brown subsurface soils and light brown, olive drab, or grayish drab subsoils, in most places heavier in texture than the soils. The alluvial soils include the Lamoure, Laurel, and Maple series. The Lamoure series have dark-brown to black surface soils and yellowish-brown to gray or dark-drab, or mottled gray and brown subsoils. The Laurel series comprises types with light-gray to light grayish-brown soils and lighter colored similar or slightly heavier textured subsoils. The types of the Maple series are dark brown to gray or drab in the surface layer, and light brown to gray in the subsoil.—All of Traill County was originally treeless except for belts of timber along the Red and other rivers.—F. B. Howe.

3145. JENNINGS, A. C. **Soil washing.** Rhodesia Agric. Jour. 18: 461-468. 1 pl. 1921.—The visible evidences of erosion are the creation of dongas, the scouring and deepening of river beds, the desiccation of areas which were formerly fertile, the retrogression of vegetable life,—notably in the grasses,—and the washing of arable land. The conditions prevalent in Mashonaland are discussed, and precautionary measures are suggested.—E. M. Doidge.

3146. JOFFE, JACOB S. **The presence of sulfur oxidizing organisms in soils.** [Abstract.] Absts. Bact. 6: 13. 1922.—*Thiobacillus thiooxidans* was not found in either cultivated or uncultivated soils. *T. thioparus* was found in certain soils.—D. Reddick.

3147. JONES, D. H. A bacteriological analysis and cultural test of "nitro-bacter soil vaccine." [Abstract.] *Absts. Bact.* 6: 15-16. 1922.—The proprietary preparation was tested in plate culture and with crops. The samples proved valueless.—*D. Reddick.*

3148. JURNAY, R. C., and S. O. PERKINS. Soil survey of Bertie County, North Carolina. *Advance Sheets Field Operations Bur. Soils U. S. Dept. Agric.* 1918: 5-33. *Fig. 1., map (colored)*, 1920.—[This survey covers the same topics as Entry 3144.]

3149. KEELINE, CLARENCE. The loess soil of the Missouri valley. *Rept. Iowa State Hort. Soc.* 54: 254-259. 1919.—The author discusses the origin and chemical composition of the soils of Iowa.—*L. H. Pammel.*

3150. KELLEY, W. P., and S. M. BROWN. The solubility of anions in alkali soils. *Soil Sci.* 12: 261-285. 12 *fig.* 1921.—Samples of air-dry soil were extracted on a mechanical shaker and the extract filtered through a Pasteur Chamberland filter. The carbonate, bicarbonate, chloride, sulphate, total solids, and H-ion concentrations were determined. Approximate equilibrium was reached after shaking about 1 hour. The total carbonate, bicarbonate, and sulphate in 2 soils increased with the ratio of water to soil. Approximately equal amounts of nitrate and chloride were dissolved with every ratio of water to soil. The concentration of hydroxyl ions was lowest in 2 soils when the ratio of soil to water was 2 to 1, and substantially increased with dilution. Solutions of different chemical nature were obtained by extracting the soils with successive portions of water, the 1st extracts being composed mainly of the chlorides, sulphates, and nitrates, the succeeding ones containing increasing percentages of carbonate and bicarbonate.—*W. J. Robbins.*

3151. LATIMER, W. J., and CHARLES N. MOONEY. Soil survey of Braxton and Clay Counties, West Virginia. *Advance Sheets Field Operations Bur. Soils U. S. Dept. Agric.* 1918: 5-37. *Fig. 1, map (colored)*. 1920.—[This survey covers the same topics as Entry 3144.]

3152. LIPMAN, J. G., A. L. PRINCE, and A. W. BLAIR. The influence of varying amounts of sulfur in the soil, on crop yields, hydrogen-ion concentration, lime requirement and nitrate formation. *Soil Sci.* 12: 197-207. 2 *fig.* 1921.—Barley, with soy-beans as a residual crop, was grown on plots to which inoculated and uninoculated sulphur had been applied at the rate of 200, 500, 1000, 2000, and 4000 pounds per acre. There was evident injury to both crops with applications of 1000 pounds or more. At 4000 pounds per acre most of the barley plants were killed, and only a very few soy-bean plants grew. Applications of 1000-4000 pounds of sulphur caused a decided increase in the H-ion concentration after 4-8 weeks. The minimum pH value noted was 3.5. No direct correlation between the H-ion concentration and the lime requirement was found. Nitrification occurred at the highest acidity.—*W. J. Robbins.*

3153. LUMIÈRE, A. Le rythme saisonnier et le reveil de la terre. [Seasonal rhythm and the awakening of the earth.] *Rev. Gén. Bot.* 33: 545-557. *Fig. 1-8.* 1921.—The author found a substance in the water extract of the soil which inhibited germination of seed. Heating to 120°C. for 1 hour did not destroy this substance; therefore it is neither a toxin nor an enzyme. Extracts of fallen leaves gave similar results with germinating seeds. A substance comparable to the extract is formed by the growth of a microorganism of the coli type by fermentation of the leaves of annual plants. This substance, a marked reducing agent, prevents the germination of seeds by robbing the soil of its oxygen.—*J. C. Gilman.*

3154. MacINTIRE, W. H. Report on soils. *Jour. Assoc. Official Agric. Chem.* 5: 52-54. 1921.—This is a report of methods of procedure for determining sulphur in soils.—*F. M. Schertz.*

3155. MARBUT, C. F. The contribution of soil surveys to soil science. *Proc. Ann. Meeting Soc. Promotion Agric. Sci.* 40-41: 116-142. 1919-20 [1921].—This paper contains a history of the evolution of soil surveying in the U. S. A., and discussions of the characteristics now used

to differentiate soil units. A map is added showing the soil zones of the U. S. A.—*Lyman Carrier*.

3156. MEYER, D. **Kalk und Magnesiaversuche.** [Lime and magnesia investigations.] *Landw. Jahrb.* 55: 46-61. 1921.—Studies of the relative value of burnt lime and finely ground limestone; the lime-magnesia ratio; the action of burnt lime and burnt magnesia; and the fineness of fertilizer limes are reported. The crops used were *Vicia faba*, white mustard, and oats.—*A. J. Pieters*.

3157. MOONEY, CHARLES N. **Soil survey of Webster County, West Virginia.** Advance Sheets Field Operations Bur. Soils U. S. Dept. Agric. 1918: 5-23. *Fig. 1, map (colored)*. 1920.—[This survey covers the same topics as Entry 3144.]

3158. MORSE, W. J. **Some observations upon the effect of borax in fertilizers.** *Maine Agric. Exp. Sta. Bul.* 288. 89-120, *fig. 14-27*. 1920.—In Maine potato fields injury resulted from using boron-containing fertilizer at a rate equivalent to 17.6 pounds of anhydrous borax per acre. Injury also resulted in the greenhouse to potatoes at the equivalent of 7 pounds in the drill, and to beans at 4.4 pounds; none resulted to oats, wheat, and buckwheat at 8.8 pounds.—*Donald Folsom*.

3159. MORTLOCK, H. C., LOUIS A. WOLFANGER, GEORGE W. HEARN, and L. BRITTON. **Soil survey of Cheyenne County, Nebraska.** Advance Sheets Field Operations Bur. Soils U. S. Dept. Agric. 1918: 5-38. *Fig. 1, map (colored)*. 1920.—[This survey covers the same topics as Entry 3144.]

3160. MURRAY, T. J. **The effect of straw on the biological soil processes.** *Soil Sci.* 12: 233-259. 1 *fig.* 1921.—Straw applied to the soil stimulates the reproduction of bacteria. The bacteria use the straw as a source of carbon and nitrates as a source of nitrogen. The nitrate is transformed to organic nitrogen and for the time being is lost as available plant food.—*W. J. Robbins*.

3161. NELLER, J. R., and W. J. MORSE. **Effects upon the growth of potatoes, corn, and beans resulting from the addition of borax to the fertilizer used.** *Soil Sci.* 12: 79-131. *Pl. 1-13*. 1921.—Pot experiments were performed to determine the maximum amount of borax which can be applied per acre without causing injury. Plants were uninjured where fertilizer mixtures made from borax-free chemicals were applied to soil in pots in which potatoes, corn, or beans were grown. Anhydrous borax at the rate of 3 pounds per acre was the largest amount that could be applied in drills with safety to beans, for corn somewhat under 5 pounds, and for potatoes somewhat above 5 pounds per acre. Borax applied below the seed piece was more toxic than when applied above. Mixing the borax with fertilizer decreased the injury. Lime also reduced the toxicity of the borax and gypsum or manure reduced the toxicity for corn but had no influence in the case of beans or potatoes. More injury was produced in soils of low water content than in soils with high water content. The injury from commercial fertilizer carrying borax was of the same type as that from equivalent amounts of borax mixed with fertilizer salts.—*W. J. Robbins*.

3162. NEWTON, W. T. **Report of soil and crop surveys.** *British Columbia Ann. Rept. Dept. Agric.* 15: 86-92. 1920 [1921].—This is a brief summary of conditions in Nechako, Prince George, Quesnel, Dragon Lake, East Kootenay, Boundary, Similkameen, and Metcho-sin Districts.—*J. W. Eastham*.

3163. OLSON, GEO. A., and J. L. ST. JOHN. **An investigation of sulfur as a plant food.** *Washington State Agric. Exp. Sta. Bull.* 165. 69 p., 11 *fig.* 1921.—The historical introduction treats of the sulphur content of crops, soils, drainage water, and rain; the use of sulphur as related to growth and the increase of yields; and the effect of sulphur on root system, nodule

formation, sulphofication, soil nitrogen, solubility of phosphorus, availability of potassium, bacterial activity, soil acidity and manure. The experimental work was carried out on greenhouse cultures and by field tests. In the greenhouse tests the yields of dry matter from the soil treated with sulphur were on the average much larger than on the untreated soils. The field experiments were mainly with alfalfa. Elemental sulphur increased the yields but gypsum gave quicker and more pronounced yields. A bibliography of 254 titles completes the bulletin.—*F. D. Heald.*

3164. ONODERA, ISENOSUKE. Über die Gase, welche im Reisfelde bei der Zersetzung von Genge (*Astragalus sinicus*) entstehen. [On the gases which develop in the soil of rice fields during the decomposition of *Astragalus sinicus*.] Ber. Ohara Inst. Landw. Forsch. 1: 557-578. Fig. 1-12. 1920.—Experiments carried on in pots and in the field showed that when *Astragalus sinicus* (the most important green manure plant in Japan) decomposes in the soil a large amount of gas is formed. This gas is composed chiefly of methane, carbon dioxide, nitrogen, and a little hydrogen; the latter is usually absent during the last stages of decomposition. Sometimes a little oxygen is formed but this seems to be given off by algae present in the soil. When decomposition occurs in the field the gas formed in the lower strata of the soil contains more methane and carbon dioxide than nearer the surface. The amount of nitrogen is larger near the surface. Decomposition takes place more rapidly in sandy soils than in loam or clay. Practically no gas was formed in the control plots though occasionally a small amount, composed chiefly of oxygen, nitrogen, and a little carbon dioxide, was obtained. Gas formation ceases when toluol is added to the soil.—*F. F. Halma.*

3165. OSUGI, SHIGERU. Inversion of cane sugar by mineral-acid-soil. Ber. Ohara Inst. Landw. Forsch. 1: 579-597. 1920.—This is a progress report of investigations into the cause of the invariable inversion of cane sugar by mineral acid soils, which was found to be due mainly to the nature of the soil particles, and closely correlated with the degree of acidity of its potassium chloride extract. Inversion reaction of acid soils is monomolecular as in the case of acid. Sulphate and chloride of aluminium, which are found in the water extract of acid soils, react acid but have only a slight influence upon cane sugar. Silicic acid gel has the power of inversion but its presence in acid soils can barely be detected. Acid aluminium silicate is mainly responsible for the great converting power of acid soils. The pH value of the water extract of acid soils is not high enough to explain the inverting action unless it is assumed that the pH value is greater around the soil particles than in the soil solution as a whole.—*F. F. Halma.*

3166. PARKER, F. W. Methods of studying the concentration and composition of the soil solution. Soil Sci. 12: 209-232. 1921.—The displacement method of securing the soil solution was compared with the freezing point of the soil and a water extract. The displacement method consists in packing the moist soil in a cylinder provided with an outlet at the bottom. The displacing liquid is then poured on top of the soil column and the soil solution drops from the soil as gravitational water. Ethyl alcohol proved more satisfactory as a displacing liquid than water, methyl alcohol, acetone, or liquids not miscible with water. This method is satisfactory for securing the solution from soils of ordinary water content. It gave the same amount of nitrate and total salts as a 1 to 5 water extract of the soil. The freezing point method does not give a measure of the concentration of the soil solution at ordinary moisture contents because of the depression due to finely divided material when the amount of liquid is small. The soil does not cause any considerable amount of water to relinquish the role of a solvent.—*W. J. Robbins.*

3167. PITTMAN, D. W. A study of methods of determining soil alkali. Utah Agric. Exp. Sta. Bull. 170. 21 p., 8 fig. 1919.

3168. ROSS, WILLIAM H. Report on the determination of borax in fertilizers and fertilizer materials. Jour. Assoc. Official Agric. Chem. 5: 80-85. 1921.—Lipscomb-Inman-Watkins,

the Ross-Deemer, and the Richardson distillation methods for the determinations of borax in fertilizers are discussed.—*F. M. Schertz.*

3169. RUSSEL, E. J. The improvement of peaty soils. *Jour. Amer. Peat Soc.* 15: 24-33. 1922.

3170. SALISBURY, E. J. Stratification and hydrogen-ion concentration of the soil in relation to leaching and plant succession with special reference to woodlands. *Jour. Ecol.* 9: 220-240. *Fig. 10.* 1922.—In English woodland soils the author finds a distinct stratification, organic matter decreasing rapidly with increasing depth. Associated with this, and in some cases with increasing base-content, there is a gradient of H-ion concentration attaining its maximum at the surface. The author also finds a progressive increase in acidity resulting in corresponding changes in vegetation, and a more rapid leaching on high than on low ground. The hypothesis is advanced that undisturbed plant communities, especially forests, in England are tending to become progressively more acid with consequent changes in the character of the vegetation. High forest seems most favorable to this succession.—*Geo. D. Fuller.*

3171. SCHALOW, E. Zur Entstehung der schlesischen Schwarzerde. [The origin of the Silesian black earth.] *Beih. Bot. Centralbl.* II Abt. 38: 466-473. 1921.—The black soil in this region is not a true black earth, but a rich humus soil. It has been suggested that during the glacial age the great amount of water here favored plant growth, or that the area was a grass-land. The Russian black earth is due to hot dry summers and cold winters, which, with certain soils, favor a steppe vegetation. It is true that Silesia does not have this climate at present, but the post-glacial loess would produce conditions favorable to this type of vegetation.—*L. Pace.*

3172. SCOTT, HERSCHEL. The influence of wheat straw on the accumulation of nitrates in the soil. *Jour. Amer. Soc. Agron.* 13: 233-258. 1921.—When straw is applied to soil in the greenhouse there is a marked decrease in the nitrate content, which is proportional to the amount of straw added. Nitrates in the soil increase as decomposition of the straw progresses but remains lower in the presence of the straw than in the untreated soil. A more rapid accumulation of nitrates was caused by the addition of nitrogen as $(\text{NH}_4)_2\text{SO}_4$. Heavy fall applications of straw to wheat growing in the spring delayed the ripening of the grain and reduced the yield except on soils having a high nitrate content when the straw was applied. Straw (4 tons per acre) either as top dressing or worked into the soil resulted in a lower nitrate content the following spring although 2 tons per acre showed no appreciable decrease in nitrates.—*F. M. Schertz.*

3173. SMIT, B. J. Representative Transvaal soils. III. The Norite black turf. *Jour. Dept. Agric. Union South Africa* 3: 337-342. 1921.—This soil is found in the Pretoria, Rustenburg, Lydenburg, Middelburg, and Waterberg districts, and probably appears wherever the Norite outcrop of the bushveld igneous complex is found. The vegetation is sparse and consists of a thin covering of small thorn bushes and scanty grass. In a mechanical analysis the overwhelming predominance of the clay fraction is the most striking feature, the sand and silt fractions being quite subordinate. The outstanding chemical character is the high proportion of calcium carbonate. A number of analyses are given.—*E. M. Doidge.*

3174. SPILLMAN, W. J. Where do we get our nitrogen? *Proc. Ann. Meetings Soc. Promotion Agric. Sci.* 40-41: 112-115. 1919-20 [1921].—This study is based on the results published in Bulletin 336 of the Ohio Agricultural Experiment Station. Of the nitrogen of crops harvested from 3 plots, one a check, one receiving phosphoric acid and potash, and the 3rd nitrogen as well as phosphoric acid and potash, 14-31 per cent can be accounted for as having been added directly as fertilizer or indirectly by growing a legume (clover). The remainder the author concludes must result from the action of the Azotobacter group of organisms as there is no evidence of a depletion of the nitrogen content of the soil on these plots.—*Lyman Carrier.*

3175. STEPHENSON, R. E. Soil acidity and bacterial activity. *Soil Sci.* 12: 133-144. 1921.—Applications of cottonseed meal, manure, timothy hay, clover hay, green timothy, and green clover were made at the rate of 10 tons per acre to a light sandy soil and a loam soil in limed and unlimed condition. The materials were placed in 1 gallon earthenware crocks and at intervals of 2, 5, 10, 15, and 22 weeks the ammonia, nitrate, acidity, and residual carbonates were determined. As determined by the modified Tacke method, the lime requirement of neither soil was increased by the treatments except where a large amount of nitric acid was produced. Ammonification is apparently greater in the absence of lime. Lime stimulated nitrification. The sum of ammonia and nitrate is usually greater on the unlimed soil when treated with organic nitrogenous materials. When nitrogenous sources of energy were supplied, nitrification and ammonification were reduced below those in the untreated soil. Green materials were more readily attacked than the dried materials. The unlimed treatments generally gave a higher non-protein nitrogen content than the limed. The soluble unknown non-protein nitrogen was little affected by the various organic treatments.—*W. J. Robbins.*

3176. STEPHENSON, R. E. The effect of organic matter on soil reaction II. *Soil Sci.* 12: 145-163. 1 fig. 1921.—The application of oats straw at the rate of 10 tons per acre reduced nitrification and ammonification. All treatments reduced the lime requirement until nitrification had taken place. Lime-requirement determinations of the limed soils showed them capable of reacting with more lime. Hydrogen-ion determinations showed that the organic treatments generally reduced the true acidity. Changes in soil reaction followed closely the excess or deficit of ammonia over nitrate. Highly organic soils and clays exhibited a high degree of buffering, sand showed very little. Sulphuric acid or ammonium sulphate increased the hydrogen-ion concentration of the soil but citric acid did not. Nitric and sulphuric acids added in amounts equivalent to the acids which might be produced by complete nitrification of a given amount of ammonium sulphate produced more change in the pH than when the ammonium sulphate was used. The maximum value with a large excess of lime was pH 8.0.—*W. J. Robbins.*

3177. STOQUER. Influence de la température sur les propriétés absorbantes des sols. [The influence of temperature on the absorbing properties of soils.] *Compt. Rend. Acad. Sci. Paris* 173: 731-733. 1921.—Absorption of ammonia by soils at different temperatures was determined. It was found that the higher the temperature the less ammonia was absorbed and the stronger the solution the more ammonia was absorbed.—*C. H. Farr.*

3178. SÜCHTING, H. [Rev. of: ODÉN, SVEN. Die Huminsäuren. Chemische, physikalische und bodenkundliche Forschungen. (The humic acids. Chemical, physical and soils investigations.) 199 p., 21 fig. Th. Steinkopff: Dresden and Leipzig, 1919.] *Forstwiss. Centralbl.* 43: 230-234. 1921.—This book is supposed to be preliminary to a handbook on the subject, but the reviewer declares that it is too early to write such a handbook because of the incomplete state of knowledge. The work of Wiegner covers very well the field of physical effects of humus, as well as colloidal chemistry, and the more recent work of the Bremen Moor Experiment Station has fairly well covered the effects of humus on the microbiology of the soil, except that neither the relation of the microorganisms to the formation of humus, nor the substances in humus which act on them are yet understood. The chemistry of humus is almost an unknown field in the scientific sense. The problem is to determine the chemical structures of the humus bodies, and to do so requires that chemically pure humus be isolated. It is the opinion of the reviewer that Odén's whole work is of doubtful value, because he neglected to make sure that his material was pure. For the same reason, his investigations in colloidal chemistry and his attempts to determine degree of humification by colorimetric methods are not reliable.—*W. N. Sparhawk.*

3179. TAMM, O. Om Berggrundens Inverkan på Skogsmarken. [The influence of the basic rocks upon forest soils.] *Meddel. Statens Skogsförsöksanst.* 18: 105-164. Pl. 1-2, fig. 1-10. 1921.—Based upon external characteristics, there occur in the forests of Sweden 2

readily recognizable types or forms of soil designated as "brunjord" (brown soil) and "podsol." The former is the result of mould-forming plant associations, the latter of "raw-humus-" forming plant associations. A change from one type to the other points toward a corresponding change in vegetation. The profile of "brunjord" consists of a surface layer of litter underlain by 2-10 cm. or more of forest mould. Below this lies a thick stratum of rusty-brown mineral soil containing a liberal admixture of humus elements. In "podsol" the surface litter is underlain by "rawhumus." Underneath the "rawhumus" is a layer of "blekjord" (pale soil), and below this a layer of "rostjord" (rust soil). "Brunjord" is more favorable to forest growth than "podsol." Of the mineral elements, Swedish soils are most often deficient in calcium. The soils of Sweden are classified according to the capacity of the basic rocks for yielding soluble calcium salts. Soils deficient in available mineral elements may in consequence of improper culture be converted from "brunjord" to "podsol." Soils rich in available mineral elements are less subject to this transformation. Cases in which soils derived from rocks deficient in soluble calcium salts are highly productive are explained by the accumulation of such salts from herbs and leaves of trees. A discussion of cultural remedies is promised in a forthcoming publication by Hesselman.—*G. A. Pearson.*

3180. TESSENOW, M. Düngungsversuche mit verschiedenen neueren Stickstoffdüngemitteln. [Fertilizer investigations with various new nitrogeous fertilizers.] Mitteil. Deutsch. Landw. Ges. 36: 701. 1921.—A comparative trial of sulphate of ammonia, urea, and potassium-ammonium nitrate was made with potatoes as indicator crop. All the fertilizer plats yielded far in excess of the checks, the plat receiving urea giving the largest yield.—*A. J. Pieters.*

3181. TILLMAN, B. W., W. E. McLENDON, H. H. KRUSEKOPF, A. C. ANDERSON, CORNELIUS VANDUYNE, and W. J. LATIMER. Soil survey of Horry County, South Carolina. Advance Sheets Field Operations Bur. Soils U. S. Dept. Agric. 1918: 5-49. Fig. 1, map (colored). 1920.—[This survey covers the same topics as Entry 3144.]

3182. VENDELMANS, H. Synthetic agriculture. Sci. Amer. 125: 81, 88. 1921.

3183. WAKSMAN, SELMAN A. Microorganisms concerned in the oxidation of sulfur in acid and alkaline soils. [Abstract.] Absts. Bact. 6: 13. 1922.—*Thiobacillus thiooxidans* is most active in acid soils. Probably both this and *T. thioparus* are active in alkaline soils.—Economic uses of the organisms are suggested.—*D. Reddick.*

3184. WEISKE, F. Das Rhenaniaphosphat und seine Düngerwirkung. [Rhenania-phosphate and its fertilizing effect.] Mitteil. Deutsch. Landw. Ges. 36: 667-669. 1921.—This new form of phosphate was tested in comparison with Thomas phosphate and found of practically the same value. When used on bush beans its effect was particularly good, approaching that of superphosphate. The availability of this phosphate was in proportion to the solubility of the phosphoric acid in 2 per cent citric acid.—*A. J. Pieters.*

3185. WILSON, J. K. Influence of higher plants on bacteria. [Abstract.] Absts. Bact. 6: 40. 1922.—Soils in which maize was grown under sterile conditions subsequently supported better growth of a nitrate-reducing organism and of *Bacillus radicumicola* than did non-cropped soil.—*D. Reddick.*

3186. WRIGHT, DOUGLAS, JR. Equilibrium studies with certain acids and minerals and their probable relation to the decomposition of minerals by bacteria. Univ. California Publ. Agric. Sci. 4: 245-337. 35 fig. 1922.—The author reports equilibrium studies of the effect of a series of concentrations of hydrochloric, sulphuric, oxalic, phosphoric, lactic, formic, and acetic acids upon calcium silicate, orthoclase feldspar, biotite, and granite. Results were computed from the H-ion concentration of the solution as well as from the concentrations of Ca, Fe, Mg, and K. For a given mineral, and within the concentrations used, the amount

of Ca, Mg, or K coming into solution is a function of the H-ion concentration of the acid. An exception should be made in case the acid forms compounds which are less soluble at any given H-ion concentration than the original compounds in the mineral. *Azotobacter*, *Bacillus coli*, and *B. lactis acidii* were grown on the powdered minerals, the reactions resembling those produced by the acids.—*H. S. Reed*.

3187. WULFF, ADOLF. *Bibliographica agrageologica*. Mededeel. Landbouwhoogeschool [Wageningen] 20: 1-284. 1921.—A comprehensive bibliography of 3302 titles on soil science in relation to general agriculture is presented.—*J. C. Th. Uphof*.

3188. WYANT, ZAE NORTHROP. A comparison of the technic recommended by various authors for quantitative bacteriological analysis of soil. [Abstract.] Absts. Bact. 5: 9. 1921.

TAXONOMY OF VASCULAR PLANTS

J. M. GREENMAN, *Editor*

E. B. PAYSON, *Assistant Editor*

(See also in this issue Entries 2084, 2097, 2175, 2180, 2230, 2245, 2260, 2271, 2282, 2325, 2512, 2514, 2540, 2546, 2635, 2647, 3082, 3262)

GENERAL

3189. ANONYMOUS. [Rev. of: PRAIN, D. *Index Kewensis Plantarum Phanerogamarum Supplementum Quintum Nomina et Synonyma omnium Generum et Specierum ab initio MDCCCCXI usque ad finem anni MDCCCCXV*. Clarendon Press: Oxford, 1921 (see Bot. Absts. 11, Entry 3199).] Jour. Botany 60: 25-26. 1922.

3190. BARBEY-GAMPERT, M. *Esquisse de la flore des Picos de Europa*. [A sketch of the alpine flora of Europe.] Bull. Soc. Bot. Genève 12: 219-245. Fig. 1-6. 1920.—A study is presented of the regional geology, characteristic animals, and endemic plants of alpine regions of Europe. New species of plants described include: *Cirsium Chodati*, *Convolvulus europaeus*, *Myosotis pyrenaica* Pourr. forma *capitata*, *Helianthemum nummularium* (L.) Dunal var. *cantabricum*, *Iberis tenoreana* DC. var. *Tereschiana*, *I. aperta*, and *Potentilla Boubieri*.—*W. H. Emig*.

3191. BLATTER, E. *Flora Arabica*, Part 2. Rec. Bot. Surv. India 8: 123-282. 1 map. 1921.—This part includes the families Leguminosae to Compositae. Synonyms, habitat, citations of specimens, distribution, and local names are given, but no descriptions. No new names occur.—*E. D. Merrill*.

3192. BLATTER, E., and F. HALLBERG. *The flora of the Indian Desert (Jodhpur and Jaisalmer)*. Jour. Bombay Nat. Hist. Soc. 26: 968-987. 1920; 27: 40-47, 270-279. Pl. 32-34. 1920; 27: 506-519. Pl. 35-37. 1921.—The author completes his treatment of the families from Chenopodiaceae to Filices and gives a list of species with notes, geographic distribution, etc. No new names occur. The total number of species enumerated in the series is 507. The concluding parts include a general consideration of the ecological features of the region.—*E. D. Merrill*.

3193. BREED, R. S. *The work of the committee on nomenclature of the Botanical Society of America*. [Abstract.] Absts. Bact. 5: 1. 1921.

3194. CARTER, H. C., and D. N. CARTER. *Useful plants of the district of Lakhimpur in Assam*. Rec. Bot. Surv. India 6: 355-420. 1921.—An annotated list with synonyms, local names, geographic distribution, and economic uses of 239 species.—*E. D. Merrill*.

3195. CARTER, W. R., and C. F. NEWCOMBE. A preliminary catalogue of the flora of Vancouver and Queen Charlotte Islands. *Roy. 8 vo.*, 86 p. William H. Cullin: Victoria, B. C., 1921.—The present publication is an annotated list of the ferns, fern allies, and flowering plants of the islands mentioned in the title. Approximately 1500 species and varieties are recorded.—*J. M. Greenman*,

3196. CHEVALIER, AUG. Les arbres producteurs de camphre. [Trees which yield camphor.] *Rev. Bot. Appl.* 1: 12-21. 1921.—A discussion is presented of the species of the genus *Cinnamomum* included in the Section *Camphora*, together with the systematic relationships of these species, their geographic distribution, and especially their camphor-producing possibilities. The climate of Tonkin and Laos, French Indo-China, is considered by the writer to be particularly adapted to the culture of camphor-producing trees.—*P. G. Russell*.

3197. EWART, ALFRED J., and J. R. TOVEY. Contributions to the flora of Australia, No. 28. *Proc. Roy. Soc. Victoria* 32: 189-209. *Pl. 12.* 1920.—Species from the following genera are discussed especially with reference to distribution: *Acacia*, *Adriana*, *Agrostis*, *Aizoon*, *Alhagi*, *Amaranthus*, *Arundo*, *Bassia*, *Brachycome*, *Bromus*, *Buchanania*, *Caleana*, *Calochilus*, *Calostemma*, *Cassytha*, *Casuarina*, *Collomia*, *Crepis*, *Crocea*, *Cytisus*, *Echium*, *Eucalyptus*, *Ficus*, *Gleichenia*, *Gnaphalium*, *Goodenia*, *Grevillea*, *Hakea*, *Helipterum*, *Hybanthus*, *Hypolepis*, *Inula*, *Isopogon*, *Jasminum*, *Lasiospermum*, *Loranthus*, *Lolium*, *Lonicera*, *Microcala*, *Microcybe*, *Muraltia*, *Myosotis*, *Nothoscordum*, *Oxalis*, *Panicum*, *Phebalium*, *Phormium*, *Pimelea*, *Plagi-anthus*, *Polypogon*, *Pultenaea*, *Ranunculus*, *Setosa* (including characteristics for distinguishing *Setosa* and *Chamaeraphis*), *Solanum*, *Trichinium*, *Trichomanes*, *Triglochin*, *Ulmus* (including discussion of rate of growth), *Verbascum*, *Vicia*, *Zygophyllum*.—A description and plate of *Casuarina Helmsii* Ewart & Gordon n. sp. are given. This plant was named *C. humilis* by Helms but it has terete instead of angular branches.—*Eloise Gerry*.

3198. MACOUN, JAMES M., and THEO. HOLM. Report of the Canadian arctic expedition, 1913-18. Botany. Part A: Vascular plants. 5: 1A-50A. *Pl. 1-13.* F. A. Acland: Ottawa, 1921.—This portion of the Report concerns vascular plants of the western arctic coast of North American west of the 100th meridian. The localities where collections were made are listed, and a map of the region visited accompanies the enumeration of the species. "According to this enumeration 230 species of vascular plants are now known to occur on the arctic shore between point Barrow and Bathurst inlet." These plants represent 40 families of which the Compositae, Gramineae, and Ranunculaceae, respectively, have the largest representation of species.—*J. M. Greenman*.

3199. PRAIN, D. Index Kewensis plantarum phanerogamarum. *Suppl. 5.* 26 × 31 cm., 277 p. Clarendon Press: Oxford, 1921.—This 5th supplement to the Kew Index was compiled at the Royal Gardens at Kew by D. Prain with the assistance of the curators of the Herbarium. It contains references to those new genera, species, names, and combinations of phanerogams that were published between the years 1911 and 1915 inclusive. In addition to these names some also are included that were published before 1911 and undoubtedly some have been omitted that were published during the years 1914 and 1915 in exotic journals not yet available for reference in England. These names will be included in the 6th supplement of this index. The arrangement of the material in the present supplement agrees in every important particular with that of the 4th supplement except that the geographical location of each species is frequently given in greater detail. [See also *Bot. Absts.* 11, Entry 3189.].—*E. B. Payson*.

3200. SPRAGUE, T. A. The nomenclature of plant families. *Jour. Botany* 60: 69-73. 1922.—The author discusses the question of priority in some of our common family names.—*Adele Lewis Grant*.

3201. VALLENTIN, E. F. Illustrations of the flowering plants and ferns of the Falkland Islands. 8 vo., pl. 64 (colored). L. Reeve & Co.: London, 1921.—The illustrations of this

work were prepared by Mrs. E. F. Vallentin and the descriptions were written by Mrs. E. M. Cotton. A dichotomous key precedes the portrayal and descriptions of species and varieties included. No new names are recorded.—J. M. Greenman.

SPERMATOPHYTES

3202. ANONYMOUS. Orchid hybrids. Sander's complete list. Containing the names and parentages of all the known hybrid orchids whether introduced or artificially raised. Arranged in tabular, alphabetical form so that all hybrids, derived from each species or hybrid, may be ascertained at a glance. Roy. 8 vo., 225 p. Sanders: St. Albans, Belgium, Jan. 1921.—The scope and character of this publication are clearly indicated in the title. The numerous hybrids recorded since the previous edition (1915) have been included in the present list. [See also following entry].—J. M. Greenman.

3203. ANONYMOUS. Addenda to Sander's list of orchid hybrids to September 1921. Roy. 8vo. 18 p. Printed by C. G. Kohler: Antwerp, 1921.—[See also preceding entry.]

3204. BEAUVERD, G. Un hybride inédit de *Leontodon*. [An unpublished hybrid of *Leontodon*.] Bull. Soc. Bot. Genève 12: 153. 1920.—The author describes *Leontodon hispidaster*, a new hybrid between *L. autumnale* L. and *L. hispidum* L.—W. H. Emig.

3205. BEAUVERD, G. Une nouvelle race du *Veronica serpyllifolia* de la plaine Suisse. [A new race of *Veronica serpyllifolia* of the Swiss plain.] Bull. Soc. Bot. Genève 12: 155. 1920.—The author describes *Veronica serpyllifolia* L. var. *serotina* as new to science.—W. H. Emig.

3206. BEAUVERD, G., et M. BESSE. Nouveautés de la flore du Valais. [Novelties of the flora of Valais.] Bull. Soc. Bot. Genève 12: 153-155. 1920.—Descriptions of the following new plants are given: *Gentiana ciliata* L. var. *genuina* Beauv., *G. ciliata* L. subvar. *debilis* Beauv. & Besse, and *Leontodon autumnalis* L. var. *palustris* Beauv. & Besse.—W. H. Emig.

3207. BENNETT, ARTHUR. *Tillaea aquatica* L. Jour. Botany 60: 56. 1922.—A few more details are given regarding the distribution and the descriptions of *Tillaea aquatica*.—Adele Lewis Grant.

3208. BITTER, GEORG. *Solana africana*. III. [African Solanums. III.] Bot. Jahrb. 57: 248-286. 1921.—The present installment deals with the subgenus *Leptostemonum* (Dun.) Bitt. of the genus *Solanum* and includes the section *Torvaria*. It is noted that the subgenus *Leptostemonum* is difficult to characterize, and the presence of spines, as well as the peculiar form of the anthers, is not constant. Spineless forms of the included species may occur, but not spiny forms of species in the subgenus *Eusolanum*. A peculiar tendency toward unisexuality in the flowers of *Leptostemonum* is noted. Extended descriptions, synonymy, and notes are given for the various groups, subgroups, and species, and keys are added. One "section" and three "series" are described as new and the following new species, subspecies, varieties and combinations are proposed: *Solanum sordidescens*, *S. muansense* Damm. subsp. *Mildbraedii*; *S. Schumannianum* Damm. var. *austerum*; *S. Goetzei* Damm. var. *bagamojense* (Bitt. & Damm.) n. comb.; *S. anomalum* Thonn. vars. *trifurcatum* and *cinerascens*; *S. kwebense* N. E. Brown vars. *acutius*, *chondropetalum* (Damm.), *majorifrons*, and *Luederitzii* (Schinz); *S. Schimperianum* Hochst. var. *polyanthum* (Hochst.), subvar. *cordifolium*, and var. (?) *subglabrum*; *S. munitum*. [To be continued].—K. M. Wiegand.

3209. BLAKE, S. F. On the generic name *Wikstroemia*. Jour. Botany 60: 52-53. 1922.—The author gives his reasons for believing that *Lindleya* Nees is the correct generic name to be used to replace the name *Laplacea* HBK. of the Ternstroemiaceae instead of *Wikstroemia* Schrad. to which he had made the transfer in a previous publication [Contr. Gray Herb.

Harvard Univ. New Ser. 53: 36-41]. [See also Bot. Absts. 11, Entry 3239.]—*Adele Lewis Grant*.

3210. BRITTON, NATHANIEL LORD. Studies of West Indian plants. X. Bull. Torrey Bot. Club 48: 327-343. 1921.—From Trinidad the following new species are described: *Eleocharis savannarum*, *E. oropuchensis*, *Rynchospora aripoensis*, *Bromelia aurea*, *Aechmea porteioides*, *Tillandsia viscidula*, *Alpinia silvicola*, *Calathea trinitensis*, *Ficus ierensis*, *F. arimensis*, *F. Mendelsonii*, *Phoradendron chaguaramasanum* Trelease, *P. caerulescens* Trelease, *Seguiera ierensis*, *S. cordata*, *Chrysobalanus savannarum*, *Acacia quadricostata*, *Erythrina pallida* Britton & Rose, *Elaphrium trinitensis* Rose, *Phyllanthus graminicola*, *Clusia tocuchensis*, *Terminalia nyssaeifolia*, *Combretum trinitense*, *Myrcia arimensis*, *Eugenia Baileyi*, *Hydrocotyle Hazenii* Rose, *Psammisia recurvata*, *Sophoclesia trinitensis*, *Cavendishia Urichiana*, *Diospyros ierensis*, *Chrysophyllum* (?) *minutiflorum*, *Evolvulus bocasanus*, *Solanum ierense*, *S. Hazenii*, *S. capillipes*, *Codonanthe* (?) *triplinervia*, *Sabicea trinitensis* Standl. From Jamaica are described: *Pilea Maxoni*, *Zanthoxylum Harrisii* P. Wilson, *Salvia clarendonensis*, *Gesneria jamaicensis*. From Cuba are described: *Scleria motemboensis*, *Ouratea savannarum* Britton & Wilson, *Banara Brittonii* Roig, *Psidium Loustalottii* Britton & Wilson, *Jacquinia Roigii* P. Wilson, and *Tabebuia saxicola*. From Barbados is described *Tournefortia barbadensis* N. E. Brown.—P. A. Munz.

3211. CAMUS, E. G. Iconographie des Orchidées d'Europe et du Bassin Méditerranéen. [Illustrations of orchids of Europe and of the Mediterranean Basin.] Atlas folio, 122 pl. P. Lechevalier: Paris, 1921.

3212. CHODAT, R. La végétation du Paraguay. XI. Borraginacées. D. Revision critique des espèces de *Cordia* appartenant à la section *Gerascanthus* (Cham.) et de quelques autres espèces du même genre. [The vegetation of Paraguay. XI. Borraginaceae. D. Critical revision of the species of *Cordia* belonging to the section *Gerascanthus* (Cham.) and of some other species of the same genus.] Bull. Soc. Bot. Genève 12: 209-218. 1920.—The new species of plants described include: *Cordia andina*, *C. Goudoti*, and *C. macrantha*. *C. pallida* (Chod. & Hassler) Chodat appears as a new combination.—W. H. Emig.

3213. ENGLER, A. *Ctenocladus* Engl. nov. gen. Moracearum. [*Ctenocladus* a new genus of the Moraceae.] Bot. Jahrb. 57: 246-247. 1921.—The genus and 1 species, *C. Mildbraedii*, from Kamerun, are described as new. In sterile condition the plant can scarcely be distinguished from *Dorstenia*, but it is unisexual and the cymes are thrice dichotomous before they end in the crescent-shaped, partial inflorescences with long worm-like terminal bracts and small lateral ones. In inflorescence the genus is lower than *Dorstenia*, but in floral structure, especially on account of the unisexuality, it is higher. It is to be hoped that the pistillate plant may be found.—K. M. Wiegand.

3214. ENGLER, A. Gesneriaceae africanae. IV. Neue Arten und das Auftreten von Kleistogamie sowie Reduktion der Assimilationstätigkeit auf einen laubblattartigen Kotledeon bei kauleszenten Arten von *Streptocarpus*. [African Gesneriaceae. IV. New species and the occurrence of cleistogamy as well as the reduction of assimilative activity to a foliaceous cotyledon in the caulescent species of *Streptocarpus*.] Bot. Jahrb. 57: 202-219. Fig. 1-2. 1921.—The morphological conditions accompanying the occurrence of unequal cotyledons in *Streptocarpus*, one of which is very much enlarged and foliaceous, is discussed at length. This condition has only recently been discovered for the caulescent section of the genus, though common in the section *Monophyllae*. An internode between the 2 cotyledons, and buds in their axils, are often developed. Some dwarf forms have no other leaves. The enlarged cotyledons are found principally in species inhabiting rocks and tree-trunks, but since they are found occasionally in hygrophilous and ombrophilous species they are not to be considered an adaptation to the exposed habit. The discovery of cleistogamy in *Streptocarpus* is new, though it occurs frequently in the section *Caulescentes*. The cleistogamous flowers

have a regular corolla, about 5 mm. long, with cylindrical tube. Abundant seed is produced by chasmogamous flowers only in species which do not produce cleistogamous flowers. Self pollination may occur in chasmogamous flowers. Three new sections of the genus *Streptocarpus* are described and the following new species, forms, and combinations are proposed: *Saintpaulia Grotei*, *Didymocarpus Stollzii*, *Streptocarpus Kerstingii*, *S. albiflorus* and f. *nanus*, *S. violascens* and f. *nanus*, *S. gonjaensis*, *S. Ledermannii*, *S. principis* Mildbr. & Engl., *S. atroviolaceus*, *S. denticulatus*, *S. elongatus* and var. *glabrescens*, *S. muscicola*, *S. lilacinus*, *S. Mildbraedii*, *S. Zimmermannii*, *S. paucispiralis*, *S. rungwensis* and vars. *typicus* and *latifolius*, *Epithema tenue* C. B. Clarke var. *caulescens*. Notes on some already described species are included.—K. M. Wiegand.

3215. GODFERY, M. J. *Ophrys neocamusii* nom. nov. Jour. Botany 60: 58. 1922.—The name \times *Ophrys olbiensis* Godfery is changed to \times *Ophrys neocamusii* because the first name had been applied to another hybrid *Ophrys* previous to Godfery's use of it.—Adele Lewis Grant.

3216. GREENMAN, J. M. Two new *Senecios* from the West Indies. Ann. Missouri Bot. Gard. 8: 97-102. Pl. 1-2. 1921.—*Senecio subsquarrosus* Greenm. from Cuba and *S. Freemanii* Britt. & Greenm. from Trinidad are described as new.—S. M. Zeller.

3217. HARMS, H. Einige neue *Phaseolus*-Arten. [Some new species of *Phaseolus*.] Notizbl. Bot. Gard. Berlin 7: 503-508. 1921.—*Phaseolus Augusti*, *P. pachyrrhizoides*, *P. latidenticulatus*, and *P. polytylus* from Peru; *P. acariaeanthus* and *P. juranus* from Brazil; *P. Seleri* and *P. plagiocylis* from Mexico are described as new.—H. A. Gleason.

3218. IRMSCHER, E. *Begoniaceae africanae*. III. [African *Begoniaceae*. III.] Bot. Jahrb. 57: 241-245. 1921.—The paper is composed of descriptions of the following new species: *Begonia ealensis*, *B. komoënsis*, *B. horticola*, *B. cultrata*, *B. latipetiolata*, *B. gracilicaulis*, and *B. triflora*.—K. M. Wiegand.

3219. KNUTH, R. Zwei neue *Dioscorea* aus Brasilien. [Two new *Dioscoreas* from Brazil.] Notizbl. Bot. Gart. Berlin 7: 538, 539. 1921.—*D. galiiflora* and *D. Hoehniana* are described as new to science.—H. A. Gleason.

3220. KRAUSE, K. Ein neuer *Aponogeton* aus Zentralafrika. [A new *Aponogeton* from central Africa.] Bot. Jahrb. 57: 240. 1921.—*Aponogeton Braunii* is described as new.—K. M. Wiegand.

3221. KRAUSE, K. *Liliaceae africanae*. VI. [African *Liliaceae*. VI.] Bot. Jahrb. 57: 235-239. 1921.—The paper consists of descriptions and synonymy of the following new species, combinations, and forms: *Littonia modesta* Hook. f. *gracilis*, *L. littonioides* (*Sandersonia littonioides* Welw.), *Walleria armata* Schlechter & Krause, *Anthericum apicicolum*, *Chlorophytum massaicum*, *C. tsumebense* Dinter, *Albuca Stollzii*, *Dipcadi nitens*, *Asparagus Uhligii*, *A. Merkeri*, and *Cyanella ramosissima* Engl. & Krause (*Iphigenia ramosissima* Engl.).—K. M. Wiegand.

3222. LENDNER, A. Sur le *Crataegus macrocarpa* Hegetschweiler. [On *Crataegus macrocarpa* Hegetschweiler.] Bull. Soc. Bot. Genève 12: 141-142. 1920.—*Crataegus macrocarpa* Heg. has priority over *C. monogyna* var. *maurianensis* Didier, which is synonymous with it.—W. H. Emig.

3223. MERRILL, E. D. A review of the new species of plants proposed by N. L. Burman in his *Flora Indica*. Philippine Jour. Sci. 19: 329-388. 1921.—Burman's *Flora Indica* was published in 1768 and contains brief descriptions of about 1305 species. Five genera and about 241 species were proposed as new, chiefly from the Indo-Malayan region, but including forms from China, Japan, Persia, Australia, South Africa, and various parts of North and South

America. In the present review the arrangement follows the Engler and Prantl system, a short critical discussion being appended to each species. New names are *Podocarpus javanicus* (*Thuja*, Burm. f.), *P. imbricatus* (Blume), *Eleusine lagopoides* (*Cynosurus*, Burm. f.), *Rhaphidophoralaciniata* (*Polypodium*, Burm. f.), *Languas malaccensis* (*Maranta*, Burm. f.), *Dendrobium caninum* (*Epidendrum*, Burm. f.), *Aerua persica* (*Iresine*, Burm. f.), *Farsetia canescens* (*Helio-phila*, Willd.), *Crotalaria persica* (*Cytisus*, Burm. f.), *Indigofera colutea* (*Galega*, Burm. f.), *Allophylus triphyllus* (*Usubis*, Burm. f.), *Scutia myrtina* (*Rhamnus*, Burm. f.), *Abutilon persicum* (*Sida*, Burm. f.), *Tetracera akara* (*Calophyllum*, Burm. f.) *Telosma cordata* (*Asclepias*, Burm. f.), *Tylophora indica* (*Cynanchum*, Burm. f.), *Geniosporum tenuiflorum* (*Ocimum*, Burm. f.), *Artanema longifolia* (*Columnnea*, Linn.), *Peristrophe hyssopifolia* (*Dianthera*, Burm. f.), and *Gynura biflora* (*Senecio*, Burm. f.). About 38 of the species proposed by Burman cannot be properly interpreted from the short descriptions alone.—E. D. Merrill.

3224. MERRILL, E. D. Two new species of plants from Hainan. Philippine Jour. Sci. 19: 677-679. 1921.—*Trichosporum moningeriae* and *Gardenia stenophylla* are described as new.—E. D. Merrill.

3225. MILDBRAED, J. *Afrolicania* Mildbr. nov. gen. Notizbl. Bot. Gart. Berlin 7: 483-485. 1921.—The author describes a new genus and species of Rosaceae from West Africa, namely, *Afrolicania elaeosperma*.—H. A. Gleason.

3226. MOKLEY, G. L. Further notes on *Zauschneria* I. Bull. Southern California Acad. Sci. 22: 54-55. 1921.—*Zauschneria pulchella* var. *adpressa* is described as new.—Roxana Stinchfield Ferris.

3227. MUNZ, PHILIP A., and IVAN M. JOHNSTON. Miscellaneous notes on plants of Southern California—I. Bull. Torrey Bot. Club 49: 31-44. 1922.—Distributional and field notes are given for a number of species, several of which are reported from California for the first time. The following new combinations are made: *Cryptantha gracilis* var. *Hillmanii* (Nels. & Ken.), *Penstemon Clevelandii* var. *Stephensi* (Brandegge), *Penstemon Palmeri* var. *Grinnellii* (Eastw.), *Penstemon antirrhinoides* var. *microphyllus* (Gray), and *Aplopappus Gooddingi* (Nels.). *Penstemon Munzii* Johnston is described as a new species.—P. A. Munz.

3228. PAYSON, EDWIN B. A monograph of the genus *Lesquerella*. Ann. Missouri Bot. Gard. 8: 103-236. Fig. 1-34. 1921.—In this paper Payson has given a comprehensive discussion of the general morphology, geography, ecology, and taxonomy of *Lesquerella*. The species for the most part are perennial, some developing considerable woody tissue in their caudices, while a few are annual. The morphological characters which are of taxonomic value or "help to solve the intricacies of phylogeny" are discussed in detail and certain conclusions as to the development of the genus are reached. The ancestors of the genus are believed to have been herbaceous species with a well developed terminal bud, and within the genus *Lesquerella* some species have developed the rosette-forming habit in which the terminal buds remain inhibited. The entire linear or suborbicular leaves have seemingly developed from the lyrate-pinnatifid radical leaves, while in cauline leaves those narrowed to the base have been derived from those with auriculate bases. There are few differences in flower parts which are of phylogenic value in *Lesquerella* but those exhibited yield interesting tendencies. "Yellow is the predominating petal color in primitive species, while white, red, or purple is of more recent origin." Narrower petals are more recent than the obovate form. Species with dilated staminal filament bases are the forebears of those with gradually dilated or linear filaments. Although variation in nectar glands is slight in the genus, there is a tendency toward reduction. "The recurved or S-shaped pedicels are thought to have been developed from straight or curved-ascending forms." The gynophore seems to decrease in length within the genus, "yet it may not have been present in the ancestor. * * * Glabrous, spherical capsules are considered primitive, at least in the section *Eulesquerella*." Development in the capsules is from the many- to the few-ovuled forms. "Seeds provided with a narrow wing or

margin are believed to have prevailed among the most primitive species. In a few recent forms the cotyledons are not quite symmetrical and the radicle is slightly turned to one side. In cruciferous plants the character of the trichomes has been the basis of segregation of genera by many taxonomists. Their consideration in *Lesquerella* leads to the conclusion that "simple or branched trichomes are believed to have given rise to few-rayed and finally many-rayed stellae." The study of the present distribution and ecology of species of *Lesquerella* leads Payson to believe that the origin of the genus was in central Texas. The species are native chiefly to the arid parts of North America, while scattering species are found as follows: 3 in South America, 1 in Greenland and the shores of Arctic America, and 2 in Tennessee and Kentucky. The genus *Lesquerella* has 3 evident, phylogenetic branches from some ancient stock and Payson has given these definite systematic rank as sections in his taxonomic treatment. The largest of these, *Eulesquerella*, is represented by 48 species; the second, *Enantiocarpa*, by 3, and the other, *Alysmus*, by 1 extant species. The sections are divided into a total of 15 subsectional groups. Most of the species are calciphiles. Under the taxonomic treatment proper of the genus, *Lesquerella occidentalis* Wats. is designated as the type species. Of the 3 sections mentioned above, *Enantiocarpa* is described as new. Two new species, *Lesquerella publensis* and *L. Garretii*, are proposed, as well as 3 new varieties, as follows: *Lesquerella montana* (Gray) Wats. var. *suffruticosa* Payson, *L. arizonica* Wats. var. *nudicaulis* Payson and *L. condensata* A. Nelson var. *laevis* Payson. There are 5 new combinations in which *Synthlipsis Berlandieri* Gray becomes *Lesquerella lasiocarpa* (Hook.) Wats. var. *Berlandieri* (Gray) Payson, *Alyssum Schauerianum* Kuntze becomes *Lesquerella Schaueriana* (Kuntze) Payson, *Vesicaria frigida* Turcz. becomes *Lesquerella frigida* (Turcz.) Payson, *Vesicaria repanda* Nutt. becomes *Lesquerella gracilis* (Hook.) Wats. var. *repanda* (Nutt.) Payson, and *Lesquerella spathulata* Rydb. becomes *L. alpina* (Nutt.) Wats. var. *spathulata* (Rydb.) Payson. *Lesquerella velebitica* Degen was excluded as *Degenia velebitica* (Degen) Hayek and *L. thlaspiiformis* (Phil.) Gilg & Muschler as *Eudema thlaspiiforme* Phil.—S. M. Zeller.

3229. PUGSLEY, H. W. *Hieracium pulmonarioides* Villars. Jour. Botany 60: 55-56. 1922.—The confusion of *Hieracium pulmonarioides* with *H. amplexicaule* is noted as is also the growing of *H. pulmonarioides* on the ruins of the cathedral and walls of other buildings in the town of Arras and in Richmond Hill, Clifton, England.—Adele Lewis Grant.

3230. PUGSLEY, H. W. Notes on British Euphrasias.—II. Jour. Botany 60: 1-5. 1922.—This is a critical discussion of *Euphrasia confusa* Pugsl. and *E. stricta* Host. The author concludes that *E. stricta* does not occur in Great Britain. *E. confusa* Pugsl. *albida* is described as a new form.—Adele Lewis Grant.

3231. R[ENDLE], A. B. [Rev. of: ACHARIYAR, RAI BAHADUR K. RANGA, and C. TADULINGA MUDALIYAR. A handbook of some South Indian grasses. 8 vo., iv + 318 p. Government Press: Madras, 1921.] Jour. Botany 60: 62. 1922.

3232. ROPER, IDA M. A new form of wood violet. Jour. Botany 60: 55. 1922.—An unusual form of *Viola Riviniana* occurring in the neighborhood of Bristol, England, is noted and it is suggested that if the variation is repeated next season the name forma *multiflora* might be given to it.—Adele Lewis Grant.

3233. SAFFORD, W. E. *Elisia*, a botanical romance. Jour. Botany 60: 19-20. 1922.—The unreliability of an article entitled Description of a New Genus of the Family Solanaceae with Remarks on its Characters and Properties, published in March, 1847, in the New Orleans Medical and Surgical Journal, and signed "Milano," is discussed and evidence is presented to show that the descriptions of the species listed under *Elisia* are mostly imaginary.—Adele Lewis Grant.

3234. SCHLECHTER, R. Die Gattung *Promenaea* Ldl. [The genus *Promenaea*.] Notizbl. Bot. Gart. Berlin 7: 467-482. 1921.—A key to the genus *Promenaea* of the Orchidaceae is

provided, recognizing 14 species, and describing, as new, *Promenaea Malmquistiana*, *P. Dusenii*, *P. paranaensis*, *P. catharinensis*, and *P. Fuerstenbergiana* from Brazil.—H. A. Gleason.

3235. SCHLECHTER, R. Über einige neue Orchidaceen aus Colombia. [New orchids from Colombia.] Notizbl. Bot. Gart. Berlin 7: 527-532. 1921.—*Stelis Schnitteri*, *Pleurothallis Cundinamarcae*, *P. platycardium*, *P. pulvinipes*, *P. Schnitteri*, *Epidendrum Schnitteri*, and *Sobralia Kalbreyeri* are described as new.—H. A. Gleason.

3236. SCHNEIDER, CAMILLO. Notes on American willows XI. Jour. Arnold Arboretum 2: 185-204. 1921 [1922].—The present article contains remarks on the species of the section *Cordatae* and particularly on *Salix myrtillofolia* Anderss. and *S. pseudocordata* Rydb.; the synonymy and distribution are discussed at some length. This is followed by remarks on the geographical distribution of American willows and an enumeration under each state, under each province of Canada, and under the Central and South American countries of all the species and varieties recorded from these states, provinces, and countries. [See also Bot. Absts. 8, Entry 741.]-Alfred Rehder.

3237. SCHONLAND, S. A new genus of Crassulaceae. Ann. Bolus Herb. 3: 67-69. Pl. 3 A. 1921.—The new genus *Pagella* comprises a single species, *P. Archeri*, of which a description is given. It is the only known crassulaceous plant in which a haplostemonous androecium is associated with syncarpy, and it is moreover the only crassulaceous plant with syncarpous ovary known from the Southern Hemisphere.—E. M. Doidge.

3238. SMITH, W. W., and EDGAR W. EVANS. *Craigia*, a new genus of Sterculiaceae. Trans. and Proc. Bot. Soc. Edinburgh 28: 69-71. 1921.—*Craigia yunnanensis*, a species from western China, is described as new.—Roxana Stinchfield Ferris.

3239. SPRAGUE, T. A. On the generic name *Wikstroemia*. Jour. Botany 60: 53-54. 1922.—This is an answer to the article by S. F. Blake [see Bot. Absts. 11, Entry 3209] on the same subject and the suggestion is made that the generic name *Laplacea* be included in the list of "nomina conservanda" to come before the next International Congress and that the transfer of the species under it to an older genus be not made until action has been taken for or against the retention of this name.—Adele Lewis Grant.

3240. STAFF, O. A new species of *Vincentia* from the Philippines. Philippine Jour. Sci. 19: 65-66. 1921.—*Vincentia crinita* from the Philippines is described as new.—E. D. Merrill.

3241. STEPHENSON, T., and T. A. [STEPHENSON]. Hybrids of *Orchis purpurella*. Jour. Botany 60: 33-35. Pl. 561-562. 1922.—The authors discuss in detail several hybrids of *Orchis purpurella*.—Adele Lewis Grant.

3242. ULBRICH, E. Monographie der afrikanischen *Pavonia*-Arten nebst Übersicht über die ganze Gattung. [A monograph of the African species of *Pavonia* together with a survey of the whole genus.] Bot. Jahrb. 57: 54-184. 5 fig. 1920/21.—This is a comprehensive account of the Malvaceous genus *Pavonia* and the 46 African species in which the author treats the subject under the following headings: A. General part; 1. Historical, a. The species, b. The subdivisions of the genus; 2. Survey of the species and groups of the genus; 3. Morphological considerations, a. Shoot succession, b. Phyllotaxy and leaf succession, c. Organs of vegetation, d. Reproductive organs, e. Pollination; 4. Value of characters for the subdivision of the genus; 5. Survey of the African species and groups; 6. Geographical distribution, a. General distribution of the genus, b. Distribution of the species of *Pavonia* over the plant-geographical regions of Africa, Asia, and the adjacent islands, in the Mediterranean region, in the North African-Indian desert region, in the African forest and steppe region, in the region of southwest Cape Colony, and in the Madagascar region, c. Relation of the present number of

species in the various floral regions of Africa, d. Character of ranges; endemism, developmental areas, e. Habitat and ecology; 7. Means of dissemination of the African species of *Pavonia*. B. Special part, giving very detailed keys and an extended treatment of each species and variety including critical notes on synonymy, taxonomy, distribution, etc. Nine new sections and 6 new subsections are established. The following species, varieties, forms, and combinations are proposed as new: *Pavonia irakuensis*; *P. Schimperiana* vars. *genuina*, *glabrescens*, and *tomentosa* (*P. tomentosa* Hochst.); *P. Neumannii*; *P. kilimandscharica* var. *triloba*; *P. Stolzii*; *P. hirsuta* var. *microphylla*; *P. glechomifolia* vars. *glabrescens* and *tomentosa*; *P. Meeboldii*; *P. ctenophora*; *P. leptoclada* var. *glabriuscula*; *P. Kraussiana* subsp. *dictyocarpa* and its var. *Schweinfurthii*, and subsp. *craspedocarpa*; *P. calycina* (*Sida calycina* Cavan.); *P. ukambanica*; *P. gallaënsis*; *P. Stefanini*; *P. discolor*; *P. mollissima* (*P. odorata* var. *mollissima* Gareke); *P. fruticulosa*; *P. zeylanica* vars. *subquingueloba*, *microphylla*, and *glandulosa*; *P. rulingioides*; *P. arabica* vars. *genuina*, and *flavovelutina*; *P. Erlangeri*; *P. Schweinfurthii*; *P. Steudneri*; *P. Kotschyi* var. *glabrescens*; *P. eremogeiton*; *P. Schumanniana* var. *transvaalensis*.—K. M. Wiegand.

3243. URBAN, IGN. *Novitates haitienses*. [New species from Hayti.] Notizbl. Bot. Gart. Berlin 7: 495–499. 1921.—*Pilea Plumerii*, *Phthirusa bistrata*, *Cassia mornicola*, *Sebastiania Buchii*, *Abutilon Buchii*, and *Eugenia blepharidantha* are described as new.—H. A. Gleason.

3244. WILLIAMS, FREDERICK, N. Critical notes on some species of *Cerastium*. Jour. Botany 60: 74–78. 1922.—The author continues his critical notes on *Cerastium*. This paper deals with the species from *C. holostea* Hornem. to *C. insubricum* Moretti.—Adele Lewis Grant.

3245. WILLIAMSON, H. B. A revision of the genus *Pultenaea*, Part 1. Proc. Roy. Soc. Victoria 32: 210–244. Pl. 13–15. 1920.—Results of examination of material at the National Herbarium, Melbourne, and of specimens received from government botanists of other states are given. The genus is confined to Australia and comprises 92 acknowledged species; 75 are described in Bentham's *Flora Australiensis* (2 of these have been transferred to other genera and 1 reduced to a variety), 20 species have been described since. The approximate distribution is Queensland, 11 species; New South Wales, 45; Victoria, 37; Tasmania, 13; South Australia, 22; and Western Australia, 22. The most significant diagnostic characters are considered to be those of the ovary, stipules, calyx, bracts and bracteoles, and seeds. The genus is divided into sections: 1. *Eupultenaea* including *Pultenaea daphnoides* Wendl., *P. stricta* Sims, *P. Maidenii* Reader, *P. capitellata* Sieb., *P. pycnocephala* F. v. M., *P. retusa*, *P. Benthani* F. v. M., *P. Millari* Bailey, *P. myrtoides* Cunn., *P. polifolia* Cunn., *P. petiolaris* Cunn., *P. mucronata* F. v. M. (*P. polifolia* Cunn. var. *mucronata*), *P. Gunnii* Benth., *P. microphylla* Sieb., *P. cinerascens* Maiden & Betehe (*P. microphylla* var. *cinerascens*), *P. Drummondii* Meiss., *P. Skinneri* F. v. M., *P. Hartmanni* F. v. M., *P. pinifolia* Meiss., *P. pedunculata* H. K., *P. conferta* Benth., *P. pauciflora* Scott, *P. scabra* R. Br. 2. *Aciphyllum*: *P. aciphylla* Benth., *P. aspalathoides* Meiss., *P. ochreatea* Meiss. 3. *Euchilus*: *P. obcordata* Benth., *P. rotundifolia* Benth., *P. calycina* Benth., *P. acuminata* R. T. Baker, *P. spinulosa* Benth., *P. tenella* Benth., *P. Luehmanni* Maiden, *P. cymbifolia* J. M. Black. 4. *Coelophyllum*: *P. flexilis* Smith, *P. altissima* F. v. M., *P. obovata* Benth., *P. paleacea* Willd., *P. Williamsoni* Maiden (*P. paleacea* var. *Williamsoni*), *P. stipularis* Smith, *P. glabra* Benth., *P. dentata* Labill., *P. subumbellata* H. K., *P. incurvata* Cunn., *P. selaginoides* F. v. M., *P. enchilia* DC., *P. densifolia* F. v. M., *P. Campbelli* Maiden & Betehe, *P. aristata* Sieb., *P. plumosa* Sieb., *P. Bauerleni* F. v. M., *P. elliptica* Smith, *P. rosea* F. v. M., *P. largiflorens* F. v. M.—Eloise Gerry.

3246. WOLFF, H. *Umbelliferae africanæ*. II. [African Umbelliferae.] Bot. Jahrb. 57: 220–234. 1 fig. 1921.—The paper consists of the description of new genera, species, combinations, and forms as follows: *Hydrocotyle Schlechteri*, *Pycnocycla Ledermannii*, *Caucaliopsis*

gen. nov., *C. Stolzii*, *Caucalis longisepala* Engl., *Afrorison gallabatense* (*Sium gallabatense* Schweinf.), *Heteromorpha Stolzii*, *H. transvaalensis* Schlecht. & Wolff, *H. Kassneri*, *Pimpinella Mechowii* (*P. Welwitschii* var. *Mechowii* Engl.), *P. Stolzii*, *Polemannia montana* Schltr. & Wolff, *P. (?) Marlothii*, *Physotrichia diplophoides*, *Annesorrhiza altiscapa* Schltr., also f. *laciniata* and f. *lobata*, *Peucedanum Zenkeri* Engl., *P. galbaniopse*, *Lefeburia microcarpa*, *L. Nigeriae*, and *L. Naegleana*.—K. M. Wiegand.

MISCELLANEOUS, UNCLASSIFIED PUBLICATIONS

B. E. LIVINGSTON, *Editor*.

S. F. TRELEASE, *Assistant Editor*.

3247. ANONYMOUS. Glycerine from sugar. *Sci. Amer.* 125-A (November): 49. 1921.

3248. ANONYMOUS. Labeling the Capital's trees. *Amer. Forestry* 27: 768. 2 fig. 1921.
—The style of label and the plan of marking the trees are described.—Chas. H. Otis.

3249. ANONYMOUS. Ocotillo as a rubber substitute. *Pan-Amer. Mag.* 32: 219-220. 1921.
—The ocotillo—*Fouquieria splendens*, a member of the Candlewood family—is widely distributed over the alkali deserts of Mexico, Arizona, and New Mexico. The supply is practically inexhaustible because the plant renews its growth from the root as soon as the top is cut off. During the war E. Cornelius Weisgerber, searching for a waterproofing composition for painting concrete piles, concrete ships, etc., produced from the ocotillo a rubber-cellulose base preparation, which, when sprayed on dry concrete, stopped all seepage and in addition overcame the electrolytic decomposition of the steel reinforcing material in the concrete. The ocotillo is now being exploited as a rubber substitute. The entire plant except the root is used, and each ton of material yields 173 pounds of gum, 306 pounds of charcoal, 206 pounds of tar, and 130 gallons of pyroligneous liquor. A substance said to be equal to first-class rubber and identical with it chemically is extracted from the gum. The rubber content is 5 per cent of the whole plant. By-products obtained from the plant in the course of manufacture include a fiber said to be stronger than ramie, a material like hard rubber, wood alcohol, a charcoal useful in sugar making, and many of the dyes, drugs, and synthetic preparations hitherto imported from Germany.—H. N. Vinall.

3250. ANONYMOUS. [Rev. of: LEE, A. B. *The microtomists vade-mecum: A handbook of the methods of microscopic anatomy*. Edited by J. B. GATENBY with collaboration of W. M. BAYLISS and others. 8th ed., x+ 594 p. J. and A. Churchill: London, 1921.] *Nature* 109: 72-73. 1922.

3251. ADDEY, F. A universal scale for the measurement of microscope drawings. *Jour. Quekett Microsc. Club* 14: 211-214. 1921.—A device is described by which one can readily compare measurements taken under a microscope with those of a drawing or photograph made to some known magnification.—L. B. Walker.

3252. ANDREWS, F. M. A warming needle for arranging specimens in paraffin. *Proc. Indiana Acad. Sci.* 1919: 168-169. 1921.

3253. ANDREWS, F. M. An improved method for regulating the thickness of microtome sections. *Proc. Indiana Acad. Sci.* 1920: 151-154. 3 fig. 1921.

3254. BARNARD, J. E. Microscope illumination and fatigue. *Nature* 108: 468-469. 1921.
—Dominant wave-length should be as short as possible, and any modifier should reduce intensity without altering quality. Partially platinized glass screens are useful. Several of these of tested absorption are mounted in a small frame, and they can be shifted readily as desired.—O. A. Stevens.

3255. BEHRENS, CHARLES A. Pipettes for holding and measuring fluids. Proc. Indiana Acad. Sci. 1919: 223-224. 2 fig. 1921.

3256. CARR, R. H., and E. F. RIPLEY. What puts "pop" in pop corn? Proc. Indiana Acad. Sci. 1920: 261-270. 8 illus. 1921.—Time used in popping corn is an important factor, for on it depends the dextrinization of the grain. "The cellular starch wall is very elastic, permitting of wide distention and loss of some cell granules without breaking. Other corn grains split open without much cell elasticity being shown." The actual popping of corn "seems to be caused by the multiple cell explosion of steam derived from water of constitution and from hygroscopic moisture," but the amount of moisture, except in extremely wet or dry samples, is not the determining factor. Nor does there seem to be any apparent relation between the protein content and the popping quality, as was formerly supposed.—F. C. Anderson.

3257. DABNEY, T. E. Fighting the water hyacinth. Sci. Amer. 125: 260. 2 fig. 1921.—The author describes a very successful method of clearing the clogged waterways of Louisiana and Florida by means of live steam.—Chas. H. Otis.

3258. HALL, HARVEY M., and FRANCES L. LONG. Rubber-content of North American plants. Carnegie Inst. Washington Publ. 313. 65 p., 3 pl. 1921.—This publication reports the results of a war-time study of 225 plants native to the U. S. A., with reference to their rubber content and to the possibility of their being used as sources of commercial rubber. Of 64 species found to contain rubber, the following are treated in some detail because of their relatively high rubber content: *Asclepias subulata*, *A. Sullivanti*, *A. syriaca* (*A. cornuti*), *A. californica* (*Gomphocarpus tomentosus*), *A. latifolia* (*A. Jamesii*), *A. mexicana*, *A. galioides*, *A. brachystephana*, *A. speciosa*, *A. eriocarpa*, *Apocynum cannabinum*, *A. androsaemifolium*, *Acerates auriculata*, *Asclepiodora decumbens*, *Cryptostegia grandiflora*, *Jatropha cardiophylla*, and *Hymenoxys floribunda utilis*. A large number of other plants are reported on, many showing some rubber and many none.—There is a chapter on variation in the rubber-content of *Asclepias* and *Apocynum* species and one on the conjectural agricultural possibilities of these. A list of 20 titles of papers cited follows the text.—Considerable attention is given to the botanical features, ecological as well as morphological, of the plants considered.—Burton E. Livingston.

3259. HARDING, H. A., and M. J. PRUCHA. Frequency of ropy milk organisms in city milk supplies. [Abstract.] Absts. Bact. 5: 9-10. 1921.—The germs of ropy milk are fairly common in commercial sweet milk. If milk stands quietly at a low temperature, these germs often develop small isolated areas of ropiness in the cream. With the development of distinct acidity this ropiness tends to disappear. It is only when a large area of viscous (ropy) cream develops early that the situation is recognized and described as an outbreak of ropy milk.—D. Reddick.

3260. HAUSMAN, L. A. Fabrics under the microscope. Sci. Amer. 125-A (November): 35-37. 16 fig. 1921.—This article deals largely with the microscopical examination of vegetable and artificial fibers and their adulterants.—Chas. H. Otis.

3261. HOTSON, J. W. Sphagnum used as a surgical dressing in Germany during the World War. Bryologist 24: 74-78, 89-96. Pl. 5, fig. 5-9. 1921.—Sphagnum as an absorbent in surgical dressings was widely used in the Allied armies during the recent war; its use, alone or with other materials, was even wider in Germany, where its value seems to have been recognized as early as 1882 through the investigations of Neuber, at Kiel. An inexhaustible supply of the moss exists in Bavaria and parts of East Prussia. In general the technique of preparation, as developed in Germany, differed only in minor methods from that used elsewhere. The dressings were in general of 2 kinds, those made of loose moss and those made of the material compressed into cakes. In all cases the material was either steam-sterilized or treated with an antiseptic solution. The loose dressings were either quilted packets of clean moss, or pads made of moss with some cotton as a binder. For surgical daubers, plugs,

and eye-dressings, sphagnum proved nearly useless; for large pads, absorptive pillows, and for use on hospital trains, in maternity cases, etc., it proved superior to other material. The sphagnum compresses (the technique of manufacture as practiced at Edinburgh, Scotland, is given in detail) resembled cardboard and were used as splints, absorbent supports, etc. The advantages claimed for sphagnum dressings are their high absorption (3-6 times cotton), cooling effect, cheapness, and the fact that they may remain long on wounds without change. On a commercial scale sphagnum dressings are now being made by several German firms, 1 in London, and 2 or 3 in the U. S. A.—*E. B. Chamberlain*.

3262. JACKSON, H. S. A convenient laboratory plant press. *Proc. Indiana Acad. Sci.* 1920: 183-186. 2 fig. 1921.—The author describes a convenient and inexpensive plant press and box in which plants may be dried in less than 24 hours by use of electricity.—*F. C. Anderson*.

3263. LEFFMANN, HENRY. Some applications of the microscope in research. *Jour. Franklin Inst.* 193: 81-88. 6 fig. 1922.—The study of objects by direct, oblique, reflected, and polarized light, and the application of photography to microscopic objects, are mentioned. The detection of adulterations by the microscope, its use in legal questions as in the detection of poisons, and the study of coal and petrified wood are also discussed. Its use in bacteriology, especially as aided by pure culture methods and differential staining, is described. A statement of methods of determining the index of refraction of crystals and possibly of alkaloids is given.—*Ernest Shaw Reynolds*.

3264. MACFIE, R. C. Where did terrestrial life begin? *Nature* 109: 107. 1922.—The author suggests that terrestrial life probably began on mountain tops of polar regions, since these would first be cool enough and exposed to light. A reply by J. W. GREGORY states that this would be plausible if wind were absent.—*O. A. Stevens*.

3265. WYANT, ZAE NORTHRUP. Some bacteriological problems involved in the retting of flax. [Abstract.] *Absts. Bact.* 5: 208. 1921.

